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THE LANCET

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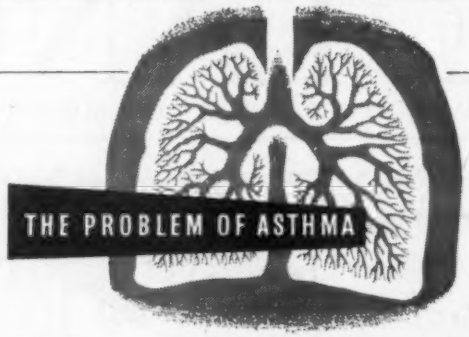

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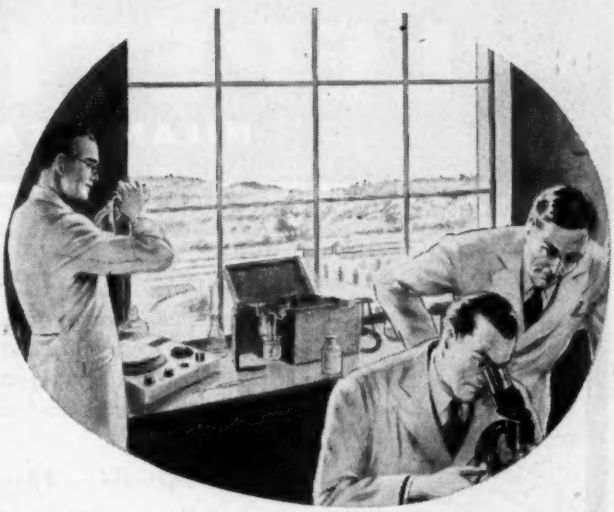

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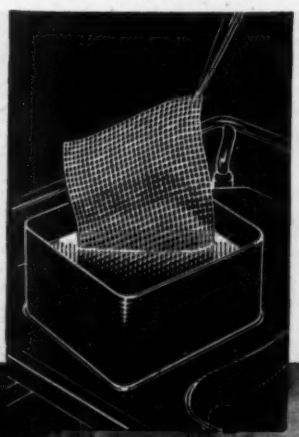

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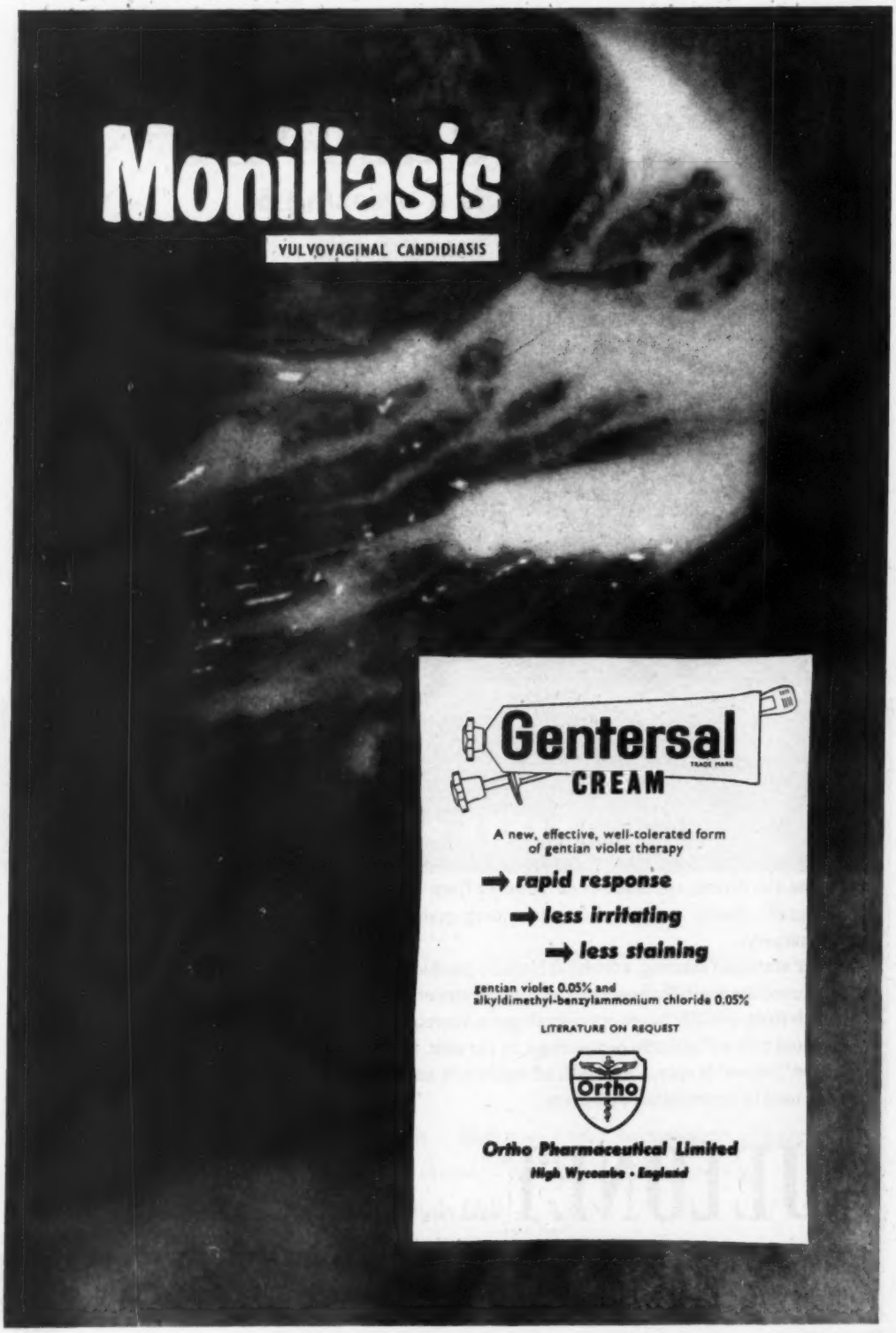
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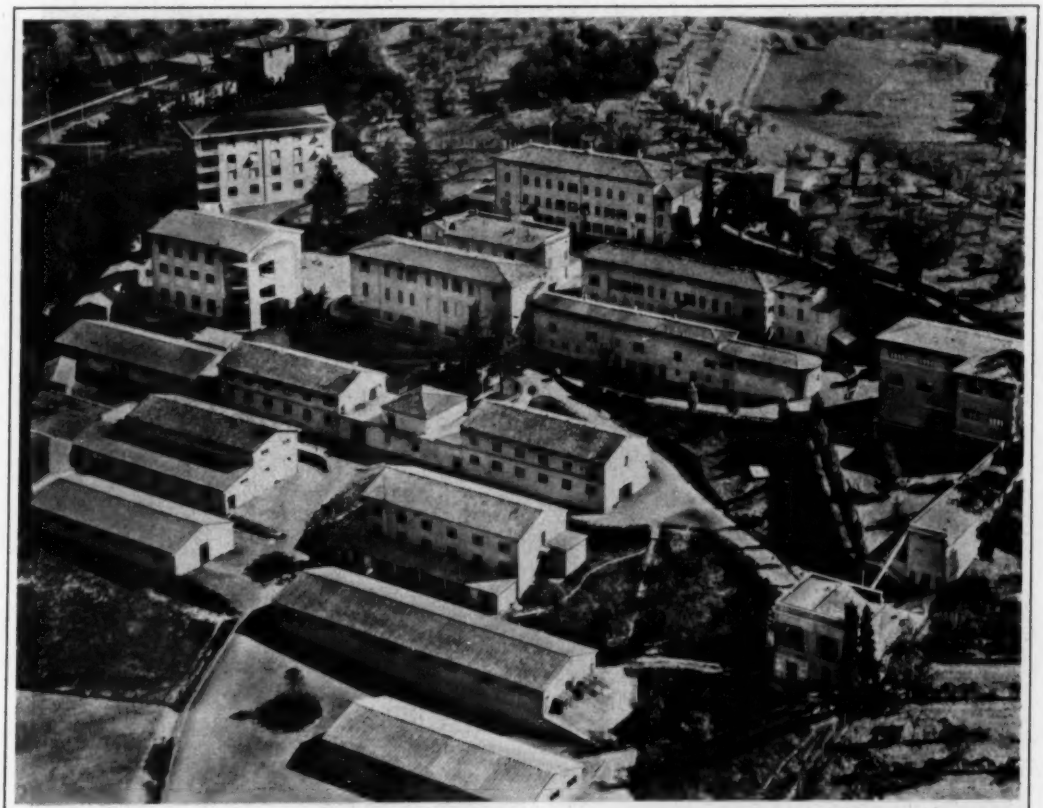

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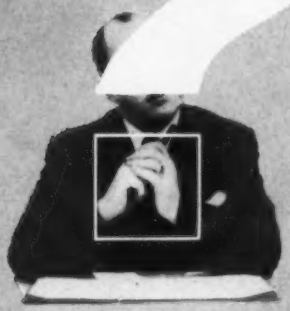

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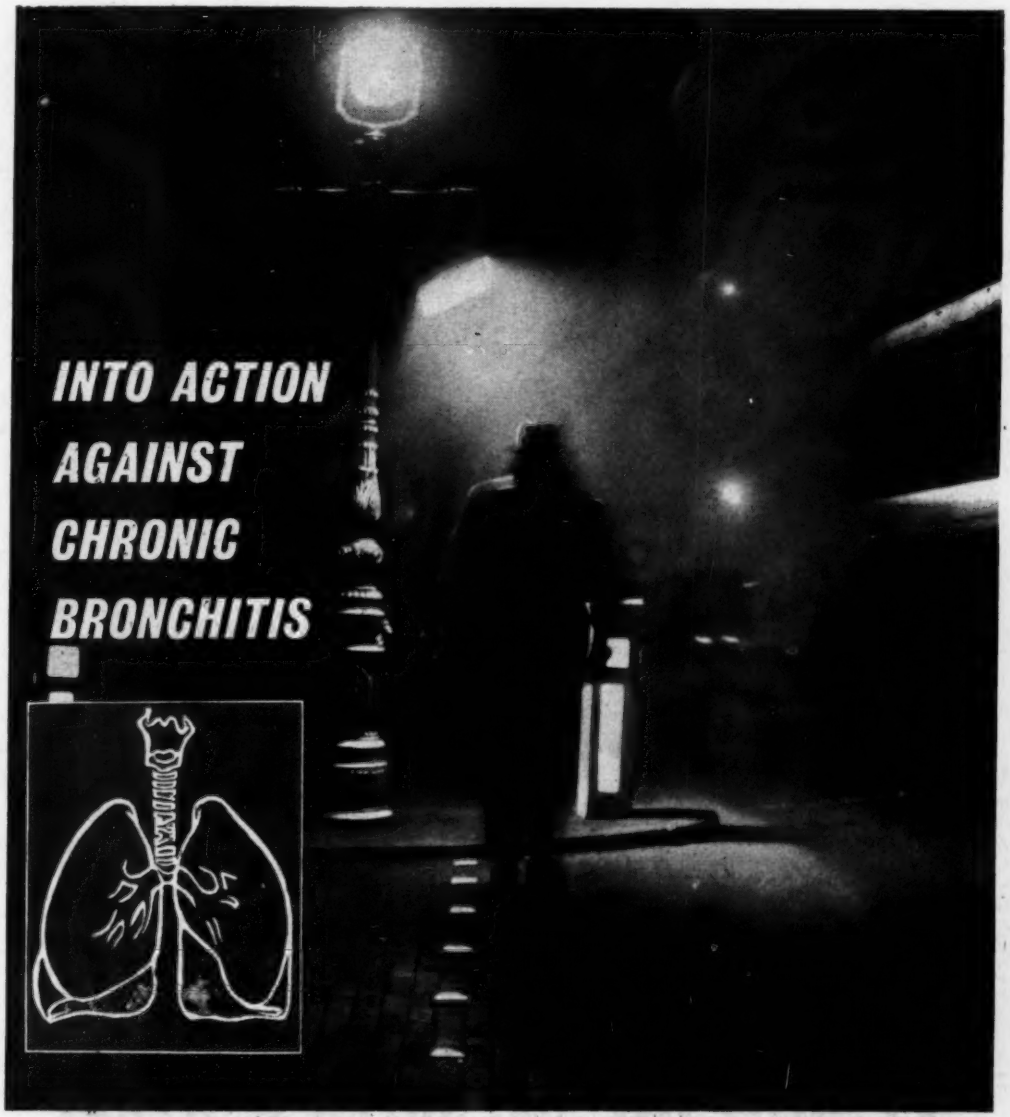

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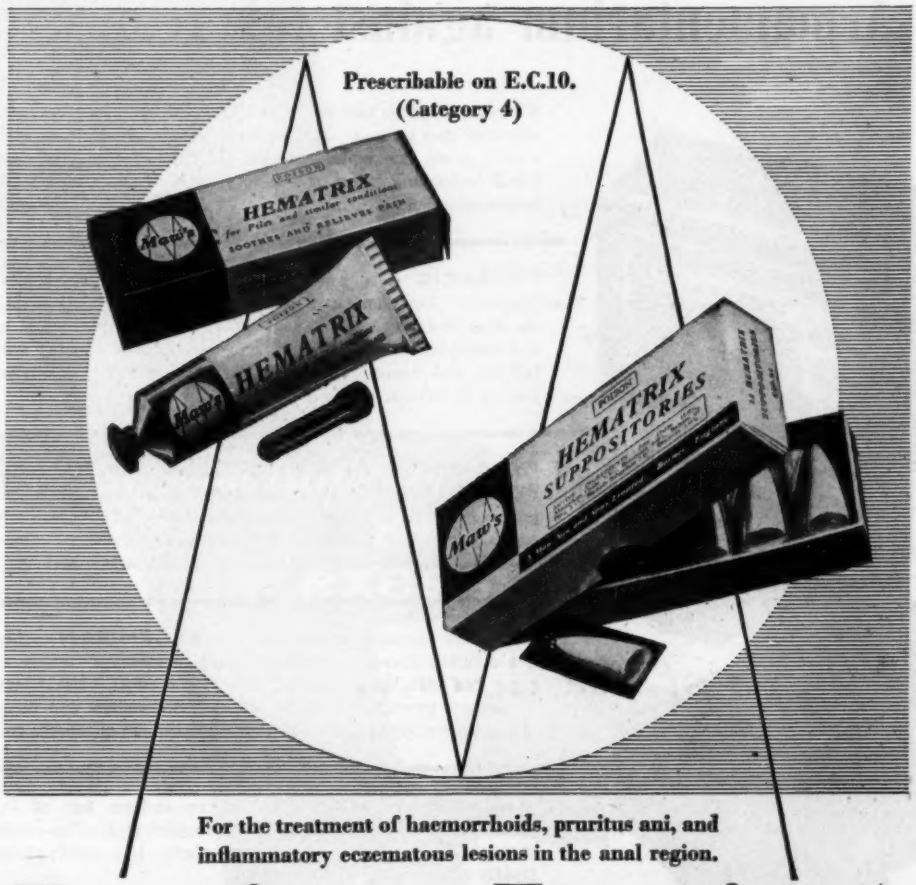

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1. *Tubercle*, 1957, *38*, 227

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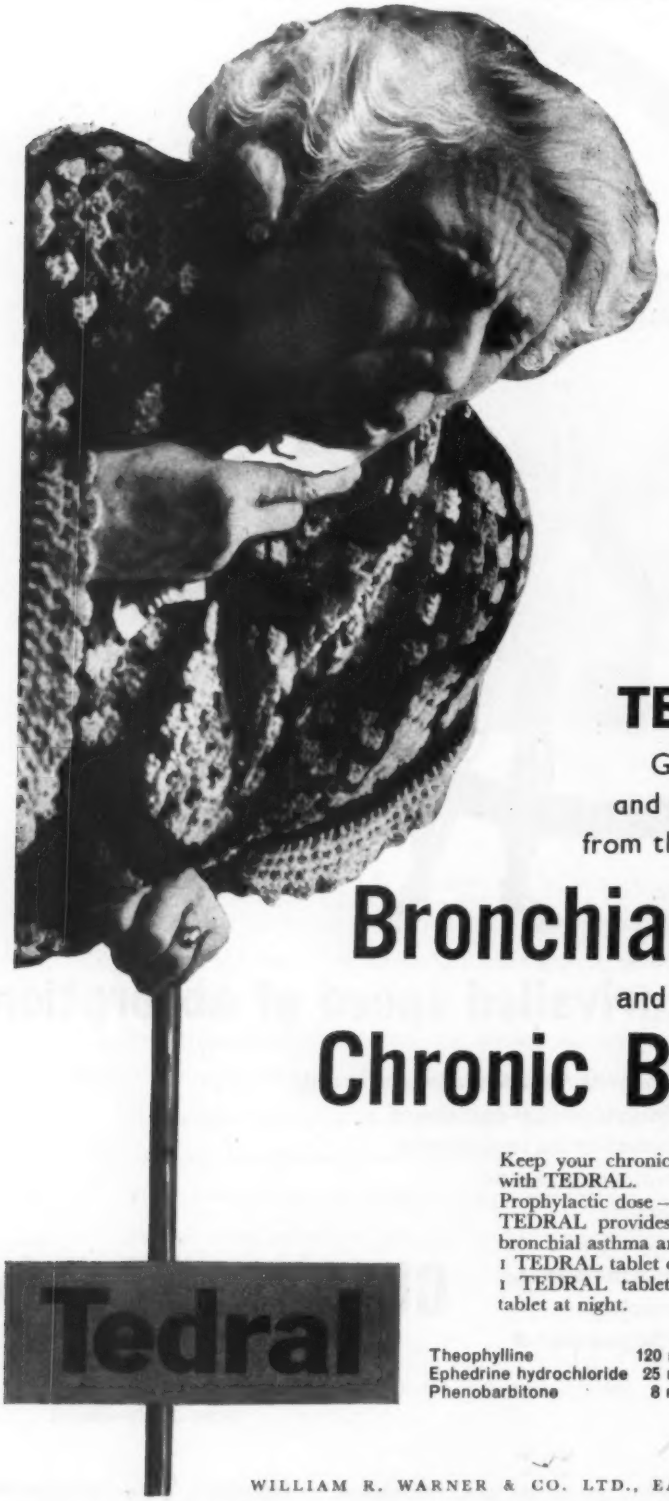

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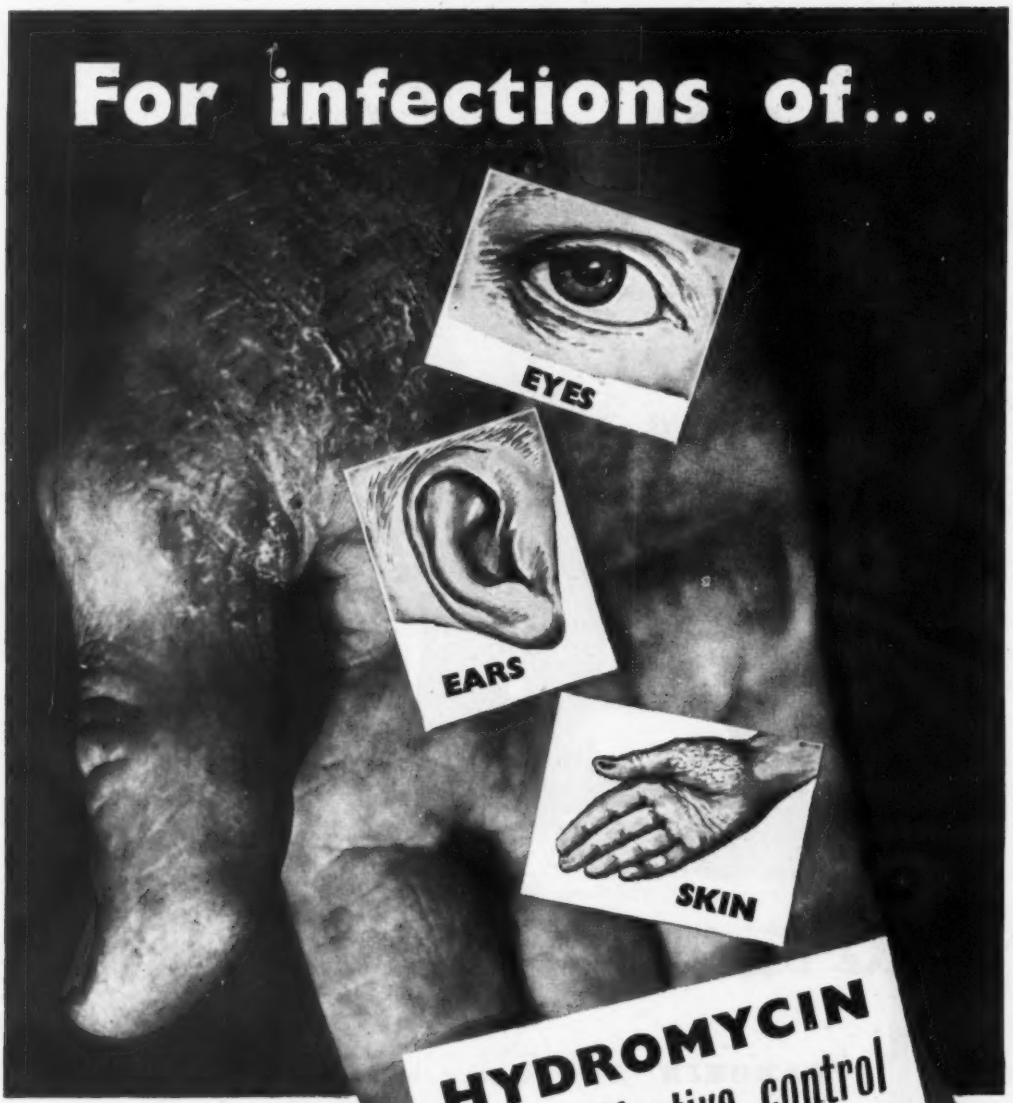

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S308

TRAINING MEDICAL STUDENTS IN PSYCHOTHERAPY *

MICHAEL BALINT
M.D. Budapest, Ph.D. Berlin, M.Sc. Manc., L.R.C.P.E.
CONSULTANT PSYCHIATRIST, THE TAVISTOCK CLINIC, LONDON, W.1

NOWADAYS most people admit that to train medical students in psychotherapy is a desirable aim. After all, half or more of the doctor's daily work, whether he is general practitioner or specialist, consists in dealing with psychological problems in his patients. The psychological problem may be the whole of the illness or it may be a consequence or an accompaniment of some physical illness; but whatever its origin, coping with it is commonly an important contribution to treatment. Of course, some research-workers, and I for one, are convinced that any therapeutic intervention, from prescribing a harmless cough mixture or a bland ointment to the most complex operation or long-term dietetic management of a chronic disease, has inevitably some elements of psychotherapy and should be evaluated as such. But even if this is an overstatement, it is certainly realistic to demand that every medical student should know something about psychotherapy.

If we agree about this, various questions arise immediately. We have to ask ourselves what to teach, how and when, and to whom. In England, in addition, we have to ask who should do the teaching. These are five awkward questions, which I cannot presume to answer satisfactorily here, but I hope at any rate to display some of the difficulties. Unfortunately, the five questions are linked, so an answer to one affects the other four. Hence my discussion must pursue a zigzag course.

What to Teach

The first question, what to teach, may seem to be answered by my premise that every medical student ought to know something about psychotherapy. But what do we mean by "something"? Every medical student ought to know "something"—indeed quite a lot—about surgery. He may not be able to perform a major operation; but he is expected to know in fair detail the surgical anatomy of most parts of the body, to understand the methods used by the specialist surgeon, to acquire enough skill to do "minor" surgery, and above all to become familiar with the way in which a surgeon thinks. Can we demand something similar of every medical student with regard to psychotherapy? Since much of his future work is likely to be a kind of psychotherapy it would be sensible to say that we should. But would it in fact be realistic?

To take surgical training for our model would limit the teaching of psychotherapy to a general survey of the ground, in which little attempt was made to give the student psychotherapeutic skill. This would have several great advantages. One is that the course need last only a few weeks; another is that instruction could be by the traditional academic methods (lectures, demonstrations, and ward rounds); a third is that students need not be much exposed to the misery and despair which surge up as soon as one probes into a patient's psychological problems; and last, but not least, no demand would be made on the student for the considerable though limited change of personality without which no proper psychotherapeutic skill can be acquired.

The grave disadvantage of this kind of scheme is that it does not equip the future general practitioner with the technique he will need badly in his daily practice; and if he lacks this technique he will have to surrender the psychotherapeutic field to the specialists in psychotherapy, in the same way as happens in surgery. When his patients need psychotherapy, he will either fob them off with futile specialist examinations or phoney medical treatments and placebos, or—as his last resort—refer them to the psychiatric services. As these services simply cannot cope with that amount of work, the psychiatrist will pick out a few patients for treatment and send the rest—or all of them, if he is not psychotherapeutically minded—back to the general practitioner with a polite but unhelpful letter and a recommendation of tonics or tranquillisers. The inclusion of a series of shocks prolongs but does not change this course of events.

To find a form of medical training which might change this distressing situation is very difficult. The best solution I can envisage is the selection which has been traditional in medicine. All medical students should be taught as much as they can be expected to take, and some of them should be offered more.

If selection is acceptable, one could teach the selected few much more than the unselected multitude, and one could aim at the few acquiring a fair amount of skill in psychotherapy corresponding to the "considerable though limited change of personality" which was one of the most important discoveries made during our training of general practitioners in psychotherapy. We found that every new skill means necessarily some change in the doctor's or student's personality. Of course, if the new skill amounts only to knowledge of the therapeutic and maintenance doses of a new drug, its repercussions on the personality are negligible. (This is one of the reasons why it is so easy to introduce new drugs into medical practice.) To acquire a new manual skill—e.g., the technique of intra-articular injection or lumbar puncture, or taking and reading an electrocardiogram or electroencephalogram—is harder than learning the doses of a new drug; and harder still is the learning of a new surgical technique invented by someone else and suited to him. All these demand a greater change in the personality. But to acquire psychotherapeutic skill is still more exacting. Why must this be so?

Psychological, neurotic, or functional symptoms arise when a person is unable to find a satisfactory solution for some of his internal conflicts. Psychotherapy has the task of understanding the conflict, of which the patient is usually unaware, or not fully aware, and then help him find a solution whereby the tension is eliminated or at any rate considerably reduced. Understanding of the conflict—of which the signs and traces may be scanty after most of it has been transformed into psychological or physical illness—is the first step in any psychotherapy. It requires from the therapist an ever-elastic capacity to identify himself with his patient—to become temporarily involved in his patient's problems—a function that we termed "listening." The therapist must be able to experiment freely in his mind with a great variety of emotional situations and complications, and none of them should exert on him so strong an attraction or repulsion that he cannot look at any patient's problem objectively, with sympathy, but also with detachment. All of us have our weak spots, the touching of which may irritate us, or (on the contrary) please us, so that we cease to see the problem clearly and as a whole.

Thus the first step in a psychological diagnosis is to establish that the patient has a conflict and that this conflict is pathogenic. The second, more difficult, step is to ascertain the nature, extent, and intensity of the conflict, and (parallel to this) the extent and power of the healthy part on the personality. The third step is to outline the therapy that will be needed to redress or resolve the conflict. The last step is then to carry out the therapy.

A considerable easing of the doctor's personality is

* An address to the staff of the department of psychological medicine at University College Hospital, in October, 1957.

required if he is to understand and diagnose psychological problems in his patients. A greater change may be necessary if he wants to be able to help the patient to find a satisfactory solution. Every human being, and particularly every doctor, has strong views on how much frustration or pain is a normal man's share, how much happiness and satisfaction he can reasonably demand, and how much help he may expect from his doctor. Although these views are hardly ever put in so many words, they profoundly influence, if not determine, the doctor's attitude to his patients. This is true in every kind of therapy, but much more so in psychotherapy. That the doctor should become aware of his "apostolic mission"—as we termed the sum total of his personal convictions [1]—is an important precondition for the exercise of psychotherapeutic skill.

What emerges from these considerations is a dynamic conception of both illness and therapy. Illness is a fruitless struggle by the patient to resolve his conflicts; therapy is an attempt by the doctor to intervene in this dynamic process so that a better equilibrium may be attained. The answer to "What to teach" is that doctors need to understand, in these dynamic terms, both the pathological and the therapeutic processes. Unfortunately such knowledge is *not* what is contained in present-day psychiatric textbooks, or what is being taught in the teaching hospitals. No doubt what is taught, too, is also psychiatry, and is an important and integral part of medicine; but it is not the psychiatry that the future doctor will need in his everyday practice. The new psychiatry is largely unwritten, and what is available is unsystematic, and largely anecdotal. It has to be collected from, say, psychosomatic medicine, psychoanalysis, experiences in general practice, the personal reminiscences of great physicians, and so on. When it is systematised it will be perhaps called "pathology of the whole person."

In this new psychiatry the traditional Kraepelinian clinical syndromes will not be treated as fully valid clinical entities. The main attention will probably be focused on the interpersonal relationships, and particularly on their pathogenic and therapeutic potentialities. A long chapter will be required for the most important therapeutic agent, the relationship between the patient and his doctor—a chapter conspicuously absent from most psychiatric or other medical textbooks.

Though this new psychiatry can be outlined in lectures and demonstrations, psychotherapeutic skill can be achieved only if we expose the pupil directly to the emotional forces obtaining in the therapeutic situation between the patient and his therapist.

This sounds somewhat formidable, but there is nothing new in it: moreover, this is exactly what English medical training, contrary to most Continental systems, has traditionally offered the students. During the greater part of their stay in the hospital they have to work as clerks and dressers, and in this way are constantly in therapeutic relationship with a sufficient number of patients.

This continuous exposure is, however, only the first step. If the student is to learn psychotherapy, he needs a sympathetic but none the less critical atmosphere in which he can discuss his therapeutic experiences, become aware of his own (and his teacher's) automatic uncontrolled responses, learn gradually to express in words his —and various other—"apostolic beliefs," and through all this acquire some degree of emotional elasticity, which then will lead to a better understanding and a better therapeutic skill. How to create the friendly but critical atmosphere brings us to our next question.

How to Teach

If we agree that the training of medical students should be planned so that all of them reach a certain standard, and a proportion of them reach a more exacting one, then the answer will fall into two parts, corresponding to the two standards.

All medical students should acquire enough knowledge of psychology and psychopathology to recognise whether the patient is labouring under a psychological conflict. Possibly they may learn enough to identify the pathogenic conflict, but I am not certain whether all students can be expected to achieve this much.

Possibly, despite some difficulties, the teaching necessary for this can be condensed into a course of limited duration presented to the whole body of students, using the traditional academic methods of lectures, demonstrations, and ward rounds. If successful, it will enable the students to acquire some diagnostic skill, and in any case it will offer them an opportunity for learning something about themselves, in the same way as the courses in anatomy and physiology teach them something about the structure and functions of their bodies. Perhaps it will also teach them something of the way a psychotherapist approaches a psychological problem; but, of course, this will largely depend on the teacher himself. Whether or not it will help them to acquire minor psychotherapeutic skill, experience alone can tell.

I am on much safer ground with regard to the other, more ambitious standard. Our experiments in training general practitioners in psychotherapy have amply proved that with many of them the standard can be reached. But two problems have to be solved before our methods can be introduced into the teaching hospitals. The first, of course, is selection, which I shall discuss when I come to "Whom to teach." The other is how to find time for this kind of training without upsetting the traditional curriculum; and I shall propose a solution under the heading "When to teach."

The method worked out by Enid Balint and myself, first for training social workers, then for general practitioners, and recently for consultants, is based on continuing case conferences. I have described them elsewhere [2–4] and will here mention a few points only. First, by continuing the conferences regularly every week for quite some time, the students can follow the development of the patient's responses and assess more truly the value—or futility—of any therapeutic intervention. Secondly, a good deal of time is needed by the participants to realise that all of them (including the leader of the conferences) may make mistakes. And still more time is required for the great discovery that, as a rule, *the* correct therapy for any given patient does not exist; instead there are several sensible solutions for the problem—each of them with advantages and drawbacks—from which the therapist must choose one suitable to the relationship between his patient and himself and acceptable to both.

This discovery presupposes that the student can tolerate awareness of his own and his fellow students' limitations—caused by their apostolic convictions—as well as his teachers'. Since the individual limitations are not identical, he gradually recognises that many human relationships have therapeutic possibilities as well as characteristic limitations. This is not at all an easy task, for it demands some detachment from one's apostolic beliefs; but such detachment leads to elasticity which is the precondition of readjustment. All this together constitutes the "considerable though limited change of personality." A snag, however, is that though this process can be aimed at, it cannot be taught according to a time-table. Moreover, the rate of change will vary in different students. Obviously one cannot demand that all students in a group should relax their defences against homosexuality by the second Wednesday, give up their narcissistic adolescent touchiness by the following Monday,

1. Balint, M. *Lancet*, 1955, i, 683.
2. Balint, M. *Brit. med. J.* 1954, i, 115.
3. Balint, M., Balint, E. *Brit. J. med. Psych.* 1955, **28**, parts 2 and 3.
4. Balint, M. The Doctor, His Patient and the Illness. London, 1957.

mitigate their hypercritical ambivalence against the teaching staff by the middle of the fourth week, control their unrealistic curiosity about other people's sexual life and their moral indignation and disgust over odd sexual practices by the end of the fifth week, and so on. This list is comical enough, but could easily be made more absurd by including in the time-table items such as coping with castration anxiety, excessive cautiousness caused by guilt feelings, rebelliousness, desire for absolute security, and the like.

Contrariwise, with some prudence, all these topics can be included in a course of lectures which then may be planned to suit a prearranged time-table. Difficulties will no doubt be encountered, and the lecturer must watch carefully so as not to demand too much at any given time from his audience. Still the rate of progress will depend largely on him. This is not the case if we aim at training psychotherapeutic skill. The question we have to ask now is, how can these two standards be integrated into the medical curriculum?

When to Teach

Some medical schools and teaching hospitals organise the teaching of psychological medicine in two phases. An elementary course in general psychology and some psychopathology is usually given during the preclinical years in the medical school, and this is followed by a few weeks' clerkship, or merely attendance, in the psychiatric department during the final or the pre-final year. This arrangement on the whole is suitable if the aim is to offer the barest minimum. The trouble with it is that the time allowed is much too short. Compared with the amount of anatomy that a medical student has to master before qualifying, the amount of psychology and psychotherapy offered him appears negligible. Moreover, even this amount is only offered him: he is not required to master it.

Unfortunately this leads us to the chronic strife among the branches of medicine about how to share out the time available for teaching, and as I cannot contribute anything except to state the strong claims of psychotherapy—which does no more than increase the strife between the haves and have-nots—I think I shall stop here.

I should, however, add a few words about the time needed for training based on continuing case conferences. Our method requires only about two hours a week, which with some good will could perhaps be fitted—say, at the end of a day—into the students' time-table. Further administrative difficulty will be caused by the proposition that these conferences should be arranged not for all but only for a proportion of the students. On the other hand, as the solution I envisage is based on voluntary participation, I do not expect much trouble, at any rate, from the students.

Whom to Teach

When we ask who should be taught the obvious answer is that all medical students ought to know something about psychotherapy. Having discussed the way in which the whole plan of training turns on what this "something" should mean, I must now turn to what a training in psychotherapy might cost the student.

Most students at a teaching hospital are about 20–25 years old, and they are usually unmarried, which means that many of them have had little if any personal experience of the adult form of sexuality. They still have before them the great task of coping with this part of their personal life. Can these people suitably be exposed to all the human suffering and misery—to a large extent sexual in origin—which a psychotherapeutic approach will commonly reveal? Moreover, is it fair to expect of them that they should not only understand and sympathise with problems which may be similar to those with which they are themselves struggling, but also remain objective and unemotional?

Further, we should not forget that a fairly large proportion of any group of people, including medical students, are suffering from neurotic troubles; and, just as it is not advisable to expose anyone with an allergic condition to an environment in which his individual allergens abound, so perhaps it is not advisable to expose all medical students to the impact of neuroses in their patients.

This raises two important secondary problems—both amounting to selection. One is selection of suitable people among medical students, and the other is selection of suitable topics for teaching to all medical students. The latter problem I have already touched on; but, as it is inseparably linked with our present subject, I must say more about it.

If we are to select from among the medical students, we have to know whom to exclude, on what basis, for how long, and from what. Of course, our decision will depend first upon what standards we expect of all doctors. If our standards are low, more medical students will be able to reach them and we have to exclude fewer. Our decision will depend also on when we expect these standards to be reached—during the training itself, or only at the time of qualification, or even only after the doctors have finished both their year of house-jobs and one or two more years either as assistants or registrars? After all, during all this time they still have somebody to advise and to look after them. These are very important decisions and obviously will influence profoundly what standards of training in psychotherapy the teaching hospital is to offer its students.

Training in psychotherapy, which requires a considerable change in the trainee's personality, is acceptable by a certain proportion of people, and most of these are keen to make good use of the opportunity given them. But this is not true of everyone. Some medical students are immature at the time of training: to demand from them a prompt change to adulthood might not only be unrealistic but also expose them to serious strains and hazards. For these people a protracted form of training would be the solution. Again, there are others whose personality is so precariously balanced that any change may endanger their adaptation and even their stability; these people must defend themselves against any change and are therefore unsuitable for proper training in psychotherapy, although they might prove excellent in some other branch of medicine. In their case, any intensive form of training is strongly contraindicated.

Before we used selection in our training seminars, we had a number of breakdowns among our fully qualified doctors, some of whom had to be advised to discontinue the training and seek therapy. Since this happened in a self-selected group of already qualified doctors, it is to be expected that many more people of this kind would be found among the unselected population of medical students. Thus, unless it is decided to restrict the aim of training to a minimum, some selection will be unavoidable.

By the way, if this proves feasible, I think it will be the first time that medical students have been positively selected for general practice. The present method is more or less to skim off the various future specialists and turn over the rest to general practice, which is a negative selection. If it is agreed that general practitioners ought to know psychotherapy—i.e., a good deal about people and the various human relationships—then they should be recruited in the first place from among the students found suitable for the course suggested, and the rest should be turned over to the various specialties. Psychologically there is a good deal to be said for this.

The selection itself could be either voluntary, by the students themselves, or enforced, by the teaching staff. Both methods have obvious advantages and disadvantages. Voluntary selection is no safeguard against immature people and severe neurotics, who may try to get

therapy in the disguise of training; whereas an enforced selection by the teaching staff must create undesirable tensions, disappointments, and resentment, apart from being painfully time-consuming, since it must be done in the form of personal interview.

Who should Teach

Who should teach psychotherapy? An obvious answer is: the staff of the psychiatric departments. But, though obvious, it may not be the right one. Quite a number of psychiatrists in this country have expressed rather strong views about the limited usefulness or even futility of psychotherapy, and similar views might well be held by the staff which they have selected and trained. My own opinion is that psychotherapy should be taught by people who not only practise it in name but also can claim that their methods achieve reasonable successes.

But even this statement has to be qualified. Some otherwise experienced and reliable psychotherapists and psychoanalysts are either not interested in this field of training or are unsuitable for it. Some of them are respected and successful teachers in their own field; but the fact that they are good at teaching, for example, psychoanalysis does not mean that they will be good at teaching psychotherapy as needed for the general practitioner. As I see it, such teaching demands a reorientation both of the teacher's personality and of his ways of thinking, and not every specialist is willing to achieve this or capable of doing so. On the other hand, I can vouch that it is a most rewarding task and well repays the necessary effort.

Summary

A scheme for teaching psychotherapy to medical students is described, based on selection according to their aptitude, maturity, and stability. If the principle of selection is acceptable, all medical students could be taught according to a prearranged plan—as is done now. Selected students could be offered an opportunity to develop proper psychotherapeutic skill at their individual tempo.

ELECTRO-ENCEPHALOGRAPHIC STUDY OF SYNCOPE

ITS DIFFERENTIATION FROM EPILEPSY

H. GASTAUT

PROFESSOR AT THE FACULTY OF MEDICINE, MARSEILLES; DIRECTOR OF DEPARTMENT OF ELECTROBIOLOGY IN THE HOSPITALS OF MARSEILLES

M. FISCHER-WILLIAMS

M.R.C.P.E.*

RESEARCH ASSISTANT, DEPARTMENTS OF NEUROSURGERY AND ELECTRO-ENCEPHALOGRAPHY, THE LONDON HOSPITAL, LONDON, E.1

THE differential diagnosis between syncope and epilepsy is extremely important and not always easy. With the everwidening concept of epilepsy this problem occurs more and more frequently since an increasing number of patients are referred to the neurologist because of a "black-out." The neurologist naturally turns to the electro-encephalogram (E.E.G.) as an aid to the diagnosis, and attempts with the E.E.G. to throw light on the nature of this loss of consciousness.

Various types of epilepsy may be mimicked by fainting, the commonest being incorrectly termed "epileptic equivalent" or "pseudo-absence." When cerebral ischæmia is sufficiently prolonged and severe, the unconsciousness is followed by convulsions, which some workers —e.g., Engel (1950)—have considered to be clinically indistinguishable from grand mal.

In 1950 the differential diagnosis between "fits" and "faints" was discussed at the Royal Society of Medicine, and it was concluded that, although the two conditions were not the same, "a common factor between the two must surely reside in the cerebral hemispheres" . . . "It is in the hemispheres that syncope and epilepsy have common ground and this similar response of the hemispheres to different abnormal states may well be reflected in the common features seen in the E.E.G." (Williams 1950).

The present study has led us to opposed conclusions in that it indicates no such common factor between the two.

Definition of Terms

Since different terms have been used in this subject, it may be useful to discuss some of them briefly. "Syncope" is derived from the Greek and means "a cutting short"; the *Oxford English Dictionary* defines it as "a failure of the heart's action, resulting in loss of consciousness, and sometimes in death." To this may be added loss of consciousness associated with postural hypotension, in which peripheral factors are probably primary and not sufficiently compensated by increased cardiac output. In its milder forms syncope may be taken as synonymous with faint or fainting, but we have chosen the term syncope because it is the one used commonly in the American and always in the French literature. The terms "faint" and "syncope" in Anglo-Saxon writings lack precision in that they cover both the loss of consciousness and the symptoms which precede and follow this loss. The French *lipothymie* describes the symptoms associated with fainting but excludes the actual loss of consciousness; this *lipothymie* denotes an unstable autonomic system, and its manifestations may be attributed to excessive parasympathetic activity. We use "syncope" here to describe loss of consciousness with or without convulsions.

Material and Methods

The material consists of 100 patients who all complained of syncope and were studied in Professor Gastaut's laboratories in Marseilles.

We have excluded from our study all the cases in which there was an obvious cause of the loss of consciousness—i.e., those with known cardiac or cerebral pathology and those with known hypersensitivity of the carotid sinus. Our patients had all lost consciousness on one or more occasions, and this unconsciousness had often been associated with pallor, sweating, nausea, malaise, and sometimes convulsions resembling grand mal. The main question to be settled was whether or not these attacks were epileptic, grand mal being defined in clinical and electrical terms as loss of consciousness with generalised convulsions and a bilateral synchronous symmetrical discharge of high-voltage 8–10 c/s waves.

The E.E.G. were recorded on 'Alvar' instruments. Simultaneous electrocardiograms (E.C.G.) and electrodermograms (E.D.G.) were taken. The E.D.G. indicates the changes in the electrical resistance of the skin, which varies with the amount of sweating; in this study it is the moving base-line which records the effect of perspiration under the frontal electrodes, and it is a sensitive index to activity of the autonomic nervous system.

Ocular compression was chosen as a method of revealing excessive vagal response—i.e., excessive parasympathetic reaction. We believed that our patients' spontaneous attacks were associated with excessive vagal activity, and we applied ocular compression to precipitate their symptoms and so enable us to study the electrical manifestations of syncope. Pressure was applied symmetrically to both eyeballs for 10–15 sec. unless it caused cardiac arrest or alarming clinical reactions, in which case it was immediately stopped.

There were two reasons for choosing ocular compression rather than pressure over the carotid sinus: the simplicity

* Working in Professor Gastaut's laboratories in Marseilles with a fellowship from the Ciba Foundation and the Institut National d'Hygiene while on study leave from the department of neurology, United Birmingham Hospitals.

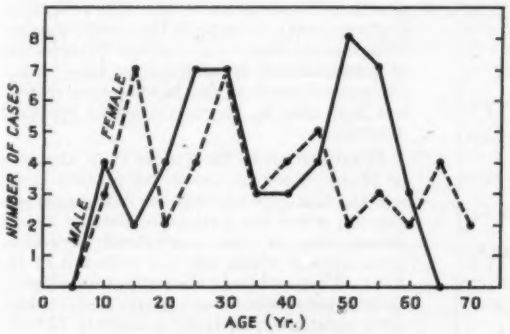

Fig. 1—Sex- and age-incidence of 100 cases of syncope (52 males and 48 females).

of ocular compression makes for uniformity in the test; and massage of the carotid-sinus region seemed to us less effective than ocular compression, although it acts specifically in some people. Compression of the carotid sinus (which, if intense, is certainly more effective than massage) has the disadvantage of obstructing the corresponding carotid artery and causing ischæmia of the ipsilateral hemisphere. In addition this compression acts differently according to its site: applied to the carotid artery below the sinus it reduces the intra-sinus pressure, whereas applied above or directly on the sinus it increases it. Bonvallet et al. (1954) have shown that distension of the carotid sinus progressively reduces cortical activity and produces slow waves.

Incidence and Precipitating Factors

There was no particular age- or sex-incidence. The series comprised 52 males and 48 females with a fairly equal age-distribution for the small numbers involved (fig. 1). We did not observe among our patients an increased incidence of any characteristic psychological or somatic type.

Classical precipitating causes of the spontaneous attacks were observed: emotion, the erect posture, fasting, and pain. We presume that, in the case of fasting, the precipitating cause of syncope was hypoglycæmia, but blood-sugar levels were not estimated. There was also evidence in these patients of an unstable autonomic system, in that they readily developed pallor, sweating, and bradycardia. Although pain may be an additional precipitating cause, the associated anxiety, apprehension, and emotion seem to be of much greater importance, and this is well seen in syncope precipitated by venepuncture. Emotion is indeed probably the most important single factor in syncope. Where pain is due to visceral distension the reflex is generally vago-vagal. Orthostatism also plays a major rôle and probably acted in army recruits who lost consciousness on duty. We observed that syncope developed much more frequently when ocular compression and electro-encephalography were done in the sitting position than in the recumbent; in fact syncope was virtually non-existent in recumbency among our otherwise healthy patients.

We also noted an interesting group of patients who had had attacks of unconsciousness when getting up at night or at dawn to micturate; there are here the associated factors of the early morning hours, when vasodilatation and a low blood-pressure are extreme, of sudden assumption of the erect posture, and of visceral distension and the parasympathetic activity of emptying the bladder. This group more often than any other had been previously diagnosed as having epilepsy. In a detailed study (Gastaut 1957, in the press) of 40 of these cases a great preponderance of males was found (35 of the 40) and all of them were aged 40–50. In symptoms, resting E.E.G., and response to ocular compression this group of nocturnal syncope associated with micturition is exactly similar to the cases included in the present study.

E.E.G. between Attacks

All the resting records—i.e., the E.E.G. between attacks—were normal. It must be emphasised that the normal resting E.E.G. was a finding and not a criterion in this study. There was some theta activity, and there were even some slow waves posteriorly in the younger patients but no more than in a normal population, and none in patients aged more than 25. Only 15 patients showed rolandic rhythms (the complex beta or rhythm *en arceau*), which is a normal percentage. An alpha rhythm was present in 87 of the patients and was normal in amplitude, frequency, and modulation. There was no significant correlation between its frequency and the heart-rate. We noted, however, that a significant proportion of the patients (39) had an alpha rhythm which was of high voltage, on the whole slow (9–10 c/s), and modulated only slightly. This corresponds to some extent to the syndrome of cortical hypo-excitability which we have often found associated with a relatively slow heart-rate. Ichinose (1947) found that this type of alpha rhythm was correlated with parasympathetic preponderance, and our views therefore coincide to some extent. We did not, however, find this type of alpha rhythm in all our patients, for some had a rapid alpha rhythm and 15 an entirely desynchronised record.

There was complete absence of any epileptic feature in the records, and overbreathing and intermittent photic stimulation were without effect. In the 3 cases in which leptazol ('Cardiazol') was used it provoked severe syncope and we have seen about 20 such cases apart from these 3. (Bonnet and Courjon 1952, Gastaut 1954). It is of great theoretical interest that leptazol provokes epilepsy in spontaneous epileptics and syncope in patients liable to spontaneous syncope, and this further differentiates the two conditions. It is not, however, advisable to use leptazol in these patients, because the syncope provoked is severe, and in any case the oculovagal test is very effective in differentiating syncope from epilepsy.

Results

Our results during and after ocular compression can be summarised as follows:

In 71 patients ocular compression caused cardiac arrest.

In 42 this lasted 4–8 seconds; in 20 it lasted longer than 10 seconds and was then associated with the clinical and electrical manifestations of syncope.

We have not taken into account mere cardiac slowing, even when the heart-rate fell more than 10 beats a minute, but only of actual asystole lasting 2 sec. or more; this corresponds in most cases to 2 heart beats, for the cardiac "silence" between 2 heart beats lasts about 3 sec. At normal body-temperature any pause lasting more than $1^1/_2$ sec. may safely be interpreted as cardiac arrest rather than cardiac slowing.

Clinical and Electrical Description of Syncope

Loss of consciousness following ocular compression never occurred in our series without asystole. When the heart stops for only about 3–6 sec., there are no clinical or electrical abnormalities; there is only desynchronisation of the E.E.G. due to "blocking" of cortical rhythms as a reaction to the pain of ocular compression.

When cardiac arrest lasts about 7–13 sec., slow waves appear, either gradually or suddenly, usually but not always concomitant with the disturbance of consciousness. After the desynchronisation caused by ocular compression the alpha rhythm may reappear and gradually increase in amplitude and decrease in frequency until there is "notching", showing that it is combined with subharmonic rhythms. Theta and delta rhythms

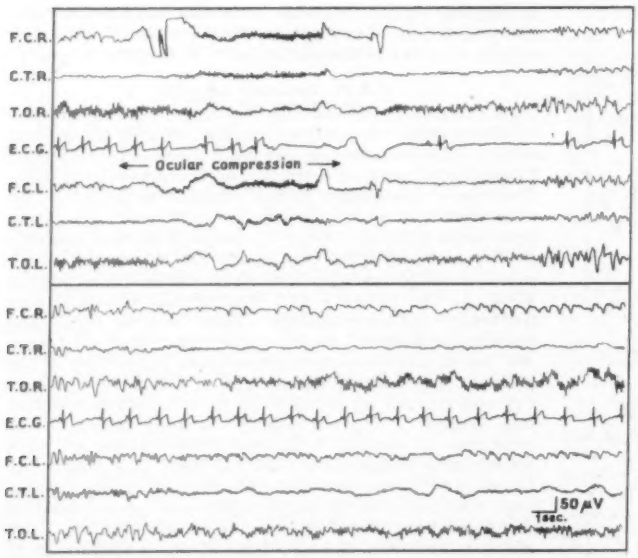

Fig. 2—Effects of ocular compression on E.E.G. and E.C.G. in patient complaining of spontaneous syncope. Compression for 9 sec. produced immediate cardiac arrest for 13 sec., interrupted by a single heart beat, and followed by generalised slow waves appearing gradually. (Note desynchronisation of E.E.G. during ocular compression.) F.C. frontocentral; C.T. centrotemporal; T.O. tempo-occipital; R. right; L. left. The lower tracing is a continuation of the upper one.

appear progressively but insensibly (fig. 2). Or else theta waves and even large-amplitude sinusoidal delta waves appear suddenly (fig. 3). These slow rhythms are bilateral and synchronous and predominate in the frontal region. They are never associated with spikes and therefore never have an epileptic appearance. They resemble to some extent the rhythm induced by over-breathing (hyperventilation is one of the methods of precipitating syncope) but they are not identical. Thus in 2 of our patients overbreathing produced hypersynchrony, but during syncope there were bursts of slow waves of different form and different topography.

Depending on the duration of asystole and the susceptibility of the patient, this slow hypersynchrony is more or less clear-cut and more or less prolonged. It may be a reinforcement of the alpha rhythm, or it may progress to the stage of a burst of delta waves. If asystole does not last more than about 13 sec., this hypersynchrony disappears a few seconds after the heart starts beating again. The slow waves disappear in the reverse order in which they appeared. Afterwards there is usually no extinction of cortical rhythms or other abnormality, and the E.E.G. returns to normal. However, in some cases mild abnormalities persist for a little while, with low-voltage theta waves superimposed on the alpha rhythm but more or less completely masked by it. This minor residual dysrhythmia is more common when neurovegetative symptoms of "fainting" are present (these are considered below). Hypersynchrony is usually but not necessarily concomitant with disturbance of consciousness. Thus there may be well-marked hypersynchrony without any detectable clinical abnormality or, on the contrary, apparently complete loss of consciousness right from the beginning of the reinforcement of the alpha rhythm. Unfortunately, even with the most conscientious clinical observation, minor disturbances of consciousness are difficult to detect when the patient is silent and has the eyes closed; nor is it easy to be certain about transient amnesia.

If cardiac arrest lasts more than about 14 or 15 sec., there are new developments. During the last few seconds of slow hypersynchrony, when the patient is already unconscious, one or two generalised myoclonic jerks appear which are not reflected in the E.E.G. Then suddenly the patient develops an intense generalised tonic spasm in extension, with opisthotonus, looking exactly like decerebrate rigidity or a tonic cerebellar fit. These tonic contractions may be stronger on one side than the other and therefore cause lateral deviation of the head. In one of our patients the head was turned to one side, and there was flexion of the ipsilateral upper limb, producing the posture of a tonic neck-reflex response.

During the whole of this tonic spasm the E.E.G. is absolutely flat without any physiological rhythm (fig. 5). It is impossible to say whether this is desynchronisation or depression, and we prefer the non-committal term "flattening". The spasm lasts 10–20 sec., and during this time heart beats reappear; they sometimes even reappear right at the beginning of the tonic spasm, but in that case they do not prevent its evolution (fig. 5). As soon as the spasm is over, slow bilateral large-amplitude delta waves reappear, often

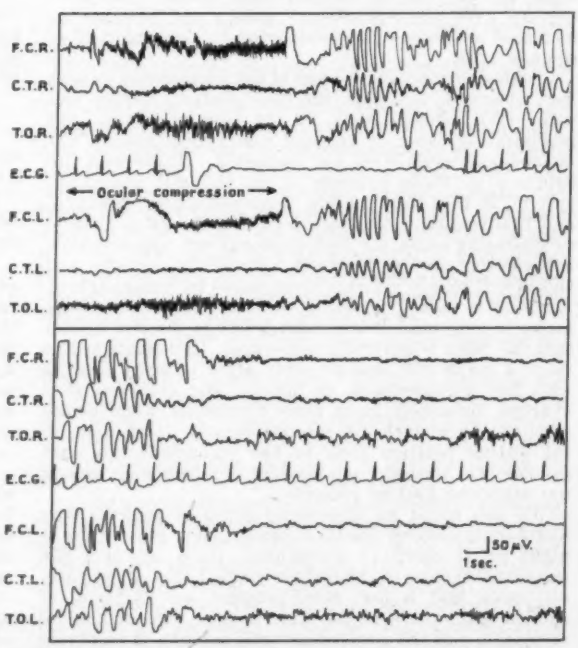

Fig. 3—Effects of ocular compression on E.E.G. and E.C.G. in patient complaining of spontaneous syncope. Compression for 9 sec. produced immediate cardiac arrest for 10 sec., and generalised slow waves (theta and delta) appeared suddenly; this condition disappeared a few seconds after the heart beat again. Placement of electrodes as in fig. 2. The lower tracing is a continuation of the upper one.

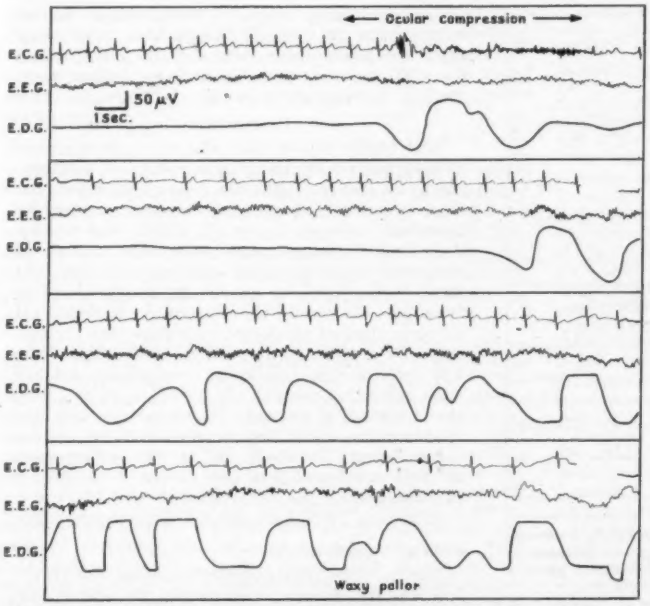

Fig. 4—Recording for 6²/₃ minutes of E.C.G., E.E.G., and E.D.G. of man, aged 27, with spontaneous syncope. Calibration is same for E.D.G. as for E.E.G. Ocular compression for 7 sec. produced immediate asystole but no concomitant effect on E.E.G.; 24 sec. later patient began to sweat (E.D.G. shows wavy line) and, whilst pallor develops, slow waves appear.

accompanied by a myoclonic jerk or two which are not reflected in the E.E.G. This slow hypersynchrony regresses gradually and disappears in 20–30 sec. The patient, however, rarely recovers his normal rhythm immediately, the record remaining abnormal for several minutes, with either poor alpha rhythm or none at all, and with slow waves predominating. These waves are of low voltage and finally become irregular and belong chiefly to the theta zone. This is a mild dysrhythmia (not a slow hypersynchrony), and physiological rhythms gradually become intermixed. During this time the patient is conscious but "feels faint."

We observed two types of syncope: immediate and delayed. Immediate syncope occurs within 1–5 sec. of ocular compression and is due to reflex vagal inhibition of the heart. Delayed syncope may occur 20, 40, or even 70 sec. after ocular compression (figs. 4 and 5); here the more important factor is almost certainly a fall in blood-pressure, although cardiac arrest also occurs at the time of the syncope.

The delayed syncopes in our series were more common than the immediate, perhaps because many of our patients were seated and the fall in blood-pressure could not be counteracted by recumbency. We have not found any previous description of this spontaneously delayed response. Engel et al. (1944) noted recurrent syncope precipitated by tilting in one case over a period of 2–3 hours, but on each occasion the factor of posture was reintroduced—i.e., the patient was again tilted up from recumbency to 70°.

Illustrative Case of Delayed Syncope (figs. 4-6)

In a young man, aged 27, ocular compression lasting 7 sec. (fig. 4) provoked cardiac arrest for 3 sec., followed by a single heart beat and another pause of 4 sec. without any other noticeable clinical effect.

The E.E.G. merely shows the "blocking" or desynchronising reaction which is normal during painful stimulation.

On the E.D.G. one sees evidence of sweating after about 1¹/₂ sec., which indicates a normal sympathetic reaction to stress.

The heart starts beating at an idioventricular rhythm of 40 per min. and then gradually accelerates and regains its initial rate of 75 per min. after 35 sec. (these times are counted from the beginning of ocular compression). The heart accelerates a little above its initial rate, reaching 80 per min. at 45 sec., and during this time there is severe sweating. However, from 45 sec. onwards the heart decelerates again in a very short time to 40 per min., reaching this idioventricular rhythm at 1 min. 15 sec.; this indicates another parasympathetic reaction.

The heart slows right down to a standstill, and with this second cardiac slowing mild clinical and electrical abnormalities appear. The alpha rhythm diminishes in amplitude and finally disappears while slow irregular low-voltage rhythms appear. During this minor dysrhythmia (which has no paroxysmal feature) the patient is waxy pale and sweating abundantly, with a sensation of malaise and nausea. This delayed cardiac arrest appears about 1 min. 15 sec. after the beginning of ocular compression.

The heart stops for 3 sec., then gives a single beat, and stops again for about 10 sec., during which time the following events take place: (1) the patient loses consciousness and becomes flaccid, and his head drops on to his chest; in this state of hypotonia and at the last moment of asystole 2 clonic jerks appear which are reflected on the E.D.G. but not on the E.E.G. (except an artefact); and (2) during this time the slow irregular delta waves, which were present before, increase. This is a hypersynchrony of delta which starts only 2 sec. after the beginning of the second cardiac pause and therefore about 5 sec. after the beginning of the previous (3 sec.) pause. (It was stated above that, in the

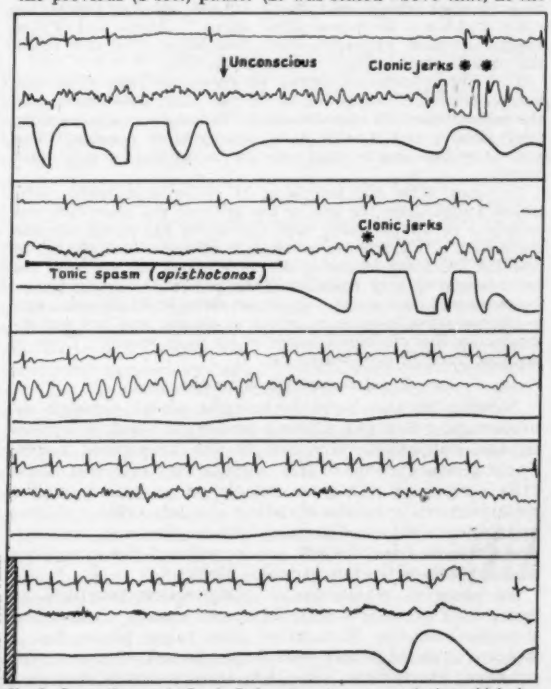

Fig. 5—Recordings as in fig. 4. Delayed cardiac arrest during which the patient loses consciousness. Note (1) clonic jerks with no effect on E.E.G. except artefact; (2) tonic anoxic fit with flattening of E.E.G. (electrical "silence") followed by (3) slow wave hypersynchrony. This syncope occurred 75 sec. after ocular compression.

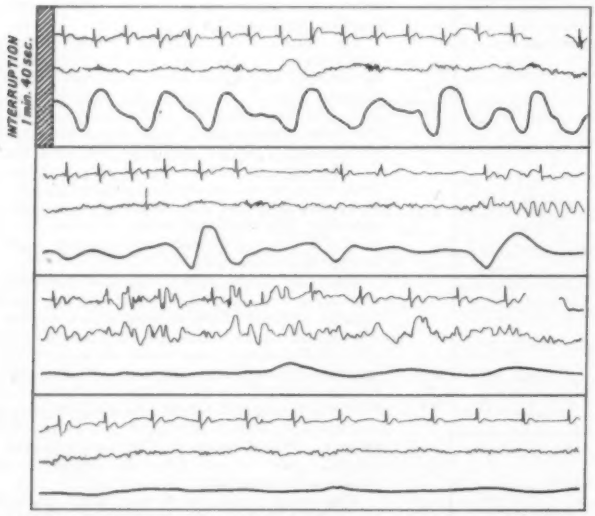

Fig. 6—Recordings as in fig. 4. Second episode of asystole nearly 6 minutes after ocular compression, preceded by intense sweating and followed by another burst of slow waves. A mild slow-wave dysrhythmia persists.

immediate type of syncope, about 7–8 sec. of asystole were required before this slow hypersynchronisation occurred. Since these slow waves result from impairment of cerebral blood-flow, the duration of this asystole obviously varies with the patient's condition, chiefly with the blood-pressure.)

At the moment when consciousness is lost, sweating (shown by the E.D.G.) stops suddenly and does not reappear until a long time after the syncope (except for a brief recurrence with the myoclonic jerks). The patient then develops tonic spasm in extension, which lasts about 10 sec., during which the E.E.G. and E.D.G. are practically "silent." At the end of this spasm the slow hypersynchrony reappears. At this point the patient gives a single violent clonic jerk.

The hypersynchrony grows progressively less while the heart, which had restarted at 30 per min., accelerates and the patient recovers consciousness. The alpha reappears only very slowly, and a mild delta dysrhythmia persists. The patient at this time is waxy pale and incontinent of urine and vomits.

$3^1/_2$ min. after the beginning of ocular compression and about 2 min. after the end of the syncope the heart-rate has returned to 75 per min., and the alpha has again become dominant. At this moment there is intense sweating (fig. 6) and the heart accelerates to 80 per min. A minute later the heart starts to slow again, and the patient, sweating freely, becomes pale once more. The heart slows to 50 per min., and a further asystole appears, which is shorter and not accompanied by loss of consciousness or by tonic spasm. There is another burst of slow waves (fig. 6).

Immediate Syncope

Slowing of the heart is brought about through an oculovagal reflex, the afferent portion of which is located in the ophthalmic division of the trigeminal nerve. Spontaneous syncope of this origin is very rare, but Weiss (1935) reported numerous attacks in a patient with a reticulum-cell sarcoma invading the left orbit; during spontaneous attacks the pulse became slow and irregular, and pressure over the left eye reproduced the symptoms and asystole with sino-auricular block.

In cases in which ocular compression provokes an immediate syncope a train of events similar to that just described in the illustrative case takes place, but a delayed syncope (which should then be termed a recurrent syncope) may follow. In a few cases we have even seen a very brief third cardiac arrest coming on a few seconds after the second cardiac arrest and associated with transient loss of consciousness or with merely neurovegetative symptoms. The same series of phenomena may appear even when ocular compression is initially ineffective. In such cases the heart only slows a little initially and then accelerates, but later there follow well-marked slowing and asystole.

Discussion

This study shows that the E.E.G. in syncope differ greatly from those in any form of epilepsy, chiefly in the fact that the convulsion which occurs in prolonged syncope is accompanied by electrical "silence" over the cortex and not by a cortical discharge. Just as a large number of dissimilar phenomena are still grouped under the term "epilepsy," so there are many types of syncope. We should therefore make it clear that we have studied an electroclinical picture precipitated by ocular compression in 100 patients who had spontaneous attacks of unconsciousness but were otherwise normal. In addition we recorded the E.E.G. of 5 patients in whom syncope was spontaneous—i.e., not precipitated by ocular compression. We shall analyse the pathogenesis of three components of this picture; the loss of consciousness; the tonic spasm; and the E.E.G. "flattening" which accompanies the tonic spasm.

Loss of Consciousness

Cardiac arrest of significant duration was always followed by syncope. Conversely, we did not have a single case (out of the 100) in which slow waves and unconsciousness appeared without asystole. We therefore believe that there was critical impairment of cerebral blood-flow in all our cases, and that the seizures were due to anoxia. The threshold for syncope was fairly constant in that clinical and electrical manifestations appeared after cardiac arrest of about 14–15 sec., but obviously this varies with certain factors. In some people the blood-pressure falls when the erect posture is assumed. Although we presume that our patients had structurally normal cerebral vessels, there were perhaps functional abnormalities associated with an unstable autonomic control. In otherwise healthy people syncope occurs almost invariably in the erect posture, but it may be seen in recumbency in patients with cerebrovascular disease (Engel 1950). Meyer et al. (1956) studied the E.E.G. in focal anoxia. Postural tilt to the semi-erect (70°) position or compression of the carotid artery produced transient neurological abnormalities and slow waves in the E.E.G. Meyer et al. also studied 11 cases of syncope in this way, but their patients differed from ours in that syncope was due to demonstrable neurological or cardiac disease. Of their 11 patients 5 showed localised slow-wave E.E.G. abnormalities on being tilted.

Although we emphasise the occurrence of asystole in the pathogenesis of syncope because we observed it in all our cases except 2, we do not underrate the importance of a fall in blood-pressure. In 2 of our 5 cases of spontaneous syncope not precipitated by ocular compression consciousness was lost without bradycardia, and these are therefore examples of pure vasodepressive syncope. Engel et al. (1944) illustrate the E.E.G. and E.C.G. of 3 cases of syncope in which there were slow waves in the E.E.G. and loss of consciousness without cardiac arrest.

There are also the rare cases of the "cerebral" type of carotid-sinus reflex hypersensitivity in which syncope apparently occurs without significant change in either pulse or blood-pressure (Weiss and Baker 1933, Engel 1950). We are not convinced of the existence of this type of syncope, for we do not know of a case in which there was continuous recording of heart-rate and blood-pressure. However, Ferris et al. (1935) and Lennox et al. (1935) and Gibbs (1942) measured the oxygen saturation in the internal jugular vein in patients with the "cerebral" type of carotid-sinus syncope and found that, in

these rare cases, there was normal oxygen saturation (60–70%) in the blood of the internal jugular vein during syncope. In all but these exceptions they found that consciousness was lost when, and only when, the blood returning from the brain became less than 30% saturated with oxygen.

Tonic Spasm

The tonic spasm in anoxic seizures apparently results from a liberation of subcortical structures and notably of the brain-stem reticular formation from the braking action of the telencephalon, diencephalon, mesencephalon, and cerebellum. It is also possible that anoxia acts directly as an excitatory agent on the reticular formation and the spinal cord. There is experimental evidence to support this :

Noell and Dombrowski (1947) showed that, during severe anoxia, there is relative electrical "silence" of the cortex but much activity in the brain-stem, particularly of the reticular formation. They produced anoxic anoxia in rabbits by inhalation of nitrogen. They recorded from the cortex, extrapyramidal system, hypothalamus, subthalamus, and central grey matter of the thalamus, cerebellum, Ammon's horn, and mid-brain. During the anoxic seizure there was electrical silence of all structures rostral to the upper end of the pons just behind the exit of the oculomotor nerve, whereas the activity in the brain-stem, particularly the reticular formation, was either unchanged or increased. The anoxic seizures in these rabbits were unlike epilepsy in two respects : (1) clinically because they consisted almost entirely of a tonic contraction in extension with opisthotonus, and only for a second or two were there a few clonic movements ; and (2) because there was no epileptic electrical discharge but only complete "flattening" of the E.E.G., a functional death of all structures rostral to the brain-stem.

Ajmone-Marsan and Fuortes (1949) induced ischæmic anoxia from cardiac arrest in dogs by injecting acetylcholine intravenously and showed flattening of the cortical potentials and hyperactivity in the spinal cord. There was sometimes tonic spasm of the limbs but only in 1 case a convulsive seizure.

Ward (1947) showed that the tonic spasm in anoxic seizures did not occur after destruction of the reticular formation. He postulated that, in anoxic seizures, the suppressor system mediated through the thalamocaudate is functionally eliminated ; this would depress the medial part of the reticular formation, which Magoun and Rhines (1946) have shown to be inhibitory. However, all the caudal part of the reticular formation, the medial as well as the lateral, shows increased activity (Noell and Dombrowski), and one must therefore conclude that the facilitatory effect of the lateral reticularis overcomes the inhibitory effect of the medial. In addition, anoxia may have a direct dynamogenic effect on the spinal cord.

"Flattening" accompanying Tonic Spasm

When asystole persists after the onset of slow waves, and when the degree of anoxia becomes greater than the telencephalon can tolerate, there is complete flattening of the E.E.G.—in other words, electrical silence. Both Noell and Dombrowski (1947) and Ward (1947) have shown that this flattening begins over the cortex and the thalamostriate nuclei (after about 15 sec.) and spreads to the diencephalon (after about 30 sec.) and then to the mesencephalon, while the brain-stem reticularis and the spinal cord show increased activity.

The slow synchronisation that follows the flattening in our cases is evidence of a functional return to life ; after a period of abnormal rhythms there is gradual recuperation of a physiological pattern. The same was observed in the dogs of Ajmone-Marsan and Fuortes (1949) and the rabbits of Noell and Dombrowski (1947).

Previous Electro-encephalographic Studies of Syncope

Although previous electro-encephalographic studies of syncope have been made, few workers have recorded the electrical manifestations of the actual attack.

From the clinical description of the spontaneous attacks it is clear that some of Kershman's (1949) patients were epileptic, and his conclusions are therefore invalid.

Margolin et al. (1941) studied 11 cases of hypersensitivity of the carotid sinus and found bursts of slow waves a few seconds after stimulation of the carotid sinus.

Engel and Margolin (1942) showed that slow waves were a prominent feature during carotid-sinus syncope : these were cases of the "circulatory" or "cardiac" type of syncope—i.e., cardiodepressor or vasodilator with bradycardia and/or fall in blood-pressure (Weiss and Baker 1933).

Lennox et al. (1938) observed high-voltage slow waves followed by flattening in carotid-sinus syncope of the "cardiac" type.

Oddly enough, Forster et al. (1942), in a study of 17 cases of hypersensitivity of the carotid sinus, concluded that slow waves were not prominent with unconsciousness, and that there was no gross disorder of cortical rhythm during this type of syncope ; but their observations do not seem to justify these conclusions.

Engel et al. (1944), in a study of 9 cases of carotid-sinus syncope and 9 of syncope on venepuncture or distension of hollow viscera, &c., found that complete unconsciousness was always accompanied by high-voltage slow waves (3–6 c/s) regardless of the mechanism by which unconsciousness was provoked.

Levin et al. (1945), in a study of E.E.G. between attacks of 229 patients complaining of "fainting spells" or "dizzy spells" sometimes accompanied by "rigidity," conclude that "repeated syncopal attacks do not produce E.E.G. abnormalities."

Bonnet and Courjon (1952) recorded 14 cases of "fits of syncopal appearance" of which all except 2 were provoked by leptazol together with intermittent photic stimulation. The stage of general malaise, pallor, and sweating was accompanied by slow waves and followed by flaccidity and then one or two tonic spasms together with total extinction of all cortical rhythms. These findings agree with ours, but the interpretation differs. These workers did not have simultaneous E.C.G. and did not recognise the anoxic nature of the fits. They believed (we think mistakenly) that they were examples of "vegetative epileptic equivalents."

In summary we may say that there is fairly general agreement that slow waves are seen in syncope, but actual anoxic fits have up till now rarely been recorded.

Practical Use of Oculovagal Test

This test is of value in deciding whether a patient who complains of attacks of unconsciousness suffers from epilepsy or syncope. In the majority of healthy people and epileptics ocular compression, as described above, slows the heart little or not at all, and the E.E.G. is either unchanged or shows desynchronisation as a reaction to pain. There is no effect on consciousness or the E.D.G. Our results, however, seem to show that, in spontaneous syncope, ocular compression has a greater tendency than normal to produce cardiac arrest (71 cases) or else excessive bradycardia and/or tachycardia, and in 20 of the cases it precipitated an attack similar to the spontaneous. It also caused excessive sweating (shown on the E.D.G.), and these combined effects support the clinical impression that patients with spontaneous syncope have an unstable autonomic nervous system. We conclude that patients who develop immediate syncope (cardio-inhibitory type of syncope) are abnormally sensitive to vagal stimulation, whereas those with delayed syncope (predominantly vasodepressive type) have an excessive sympathetic as well as parasympathetic reaction. In the first group the mechanism may be considered to be nervous and in the second neurohumoral.

In addition to these 100 cases of syncope in patients who were otherwise healthy, a similar E.E.G. study was made (Gastaut and Gastaut 1957 in the press) of syncope associated with Stokes-Adams attacks, aortic or congenital heart-disease, cerebellar or brain-stem tumour, &c. The symptoms are the same as in the 100 cases of "idiopathic" syncope. Similarly, the resting E.E.G. were normal, apart from changes due to the underlying lesions, and ocular compression had a greater tendency than normal to produce cardiac inhibition.

The oculovagal test is also of practical use in infants and young children (Gastaut and Gastaut 1957) to

differentiate epilepsy from breath-holding attacks and febrile convulsions. 50 children aged from 5 months to 7 years were studied: 25 were healthy controls, with no history of fits and with normal E.E.G. and E.C.G. in whom ocular compression produced no change in the E.E.G. and only occasional slight bradycardia; and 25 were referred with febrile fits, breath-holding attacks, or epileptic convulsions. 15 of these behaved just like our 100 cases of syncope—i.e., they had normal resting E.E.G. and E.C.G. but responded to ocular compression with (in a significant number) cardiac arrest, slow hypersynchronous waves, syncope, and tonic spasm. The parents bore witness that the precipitated seizures were similar to the spontaneous ones. The remaining 10 children were considered to be epileptic, with an abnormal resting E.E.G. but little or no response to ocular compression.

Comparison of Syncopal and Epileptic Attacks

Syncope and epilepsy resemble each other clinically in that the tonic spasm and the preceding myoclonic jerks are similar in the two conditions. When anoxia in syncope is sufficiently prolonged, tonic spasm in extension occurs, sometimes with lateral deviation of the head, and this posture of decerebrate rigidity may be seen in grand mal and in a tonic cerebellar fit.

Syncope and epilepsy, however, differ clinically in that the generalised clonic convulsions typical of grand mal are not seen in syncopal attacks. They differ from the E.E.G. point of view in that the epileptic discharge which accompanies the clonic convulsions characteristic of grand mal never occurs in syncope.

We come now to a discussion of the mechanism in the two conditions. We may postulate that in one respect it is similar in that a discharge in the pontomedullary reticular formation is responsible for the tonic phase in both conditions. This discharge of the reticular formation in experimental syncope was observed by Noell and Dombrowski (1947), Ward and Wheatley (1947), and Ajmone-Marsan and Fuortes (1949). Depression of electrical activity extends progressively from the telencephalon to the diencephalon and then to the mesencephalon and the cerebellum, during which time the caudal part of the reticular formation (in the medulla and pons) and the spinal cord develop or continue to show considerable electrical activity. These experiments show that the tonic contraction and myoclonic jerks depend on a medullary-pontine mechanism. They appear when the overlying structures have been functionally put out of action, but they are completely suppressed after the caudal part of the reticular formation has been destroyed by diathermy (Ward 1947). In syncopal attacks the process stops short at the stage of tonic spasm because the brain-stem and the reticulospinal pathways are the only structures that remain functionally active, all the higher structures being depressed by anoxia. In generalised epilepsy, on the other hand, the rest of the brain is functionally active and therefore brought into play. The discharge in the reticular formation does not remain localised in the pontomedullary region but extends up into the mesodiencephalic structures (Gastaut et al. 1957). In this rostral, thalamic part of the reticular formation it provokes discharges by the recruiting response. Electrical stimulation of low frequency of the rostral part of the reticular formation (the non-specific thalamic system) provokes discharges by the recruiting response (Dempsey and Morison 1942, Jasper and Droogleever-Fortuyn 1947, Jasper 1949, Starzl and Magoun 1951, and others) with all the characteristic features of the discharge of grand mal (bilateral, synchronous, symmetrical, and generalised, but predominating in the anterior regions with a frequency of about 8 c/s). One may postulate that discharges in grand mal are transmitted, like the recruiting response in experimental physiology, from the non-specific thalamic system to the whole of the cerebral grey matter and notably to the cortex by means of the diffuse ascending system.

We have now to explain why clonic convulsions are present in grand mal and not in syncope. There is evidence that a grand-mal attack is terminated by an inhibitory process which is localised in the telencephalon and breaks up the tonic spasm so that it is turned into the clonic convulsions characteristic of grand mal. This inhibition depends on a dual mechanism: a negative process of neuronal exhaustion, and a positive process of active inhibition. The former is due to progressive fatigue and exhaustion of the neurones; the latter process is one of active inhibition. Jung (1949) suggested that the inhibitory structure was the caudate nucleus, because it was from there that he recorded large regular slow waves coinciding with the episodes of relaxation in the clonic phase and interposed between the fast rhythms recovered from the cortex and the thalamus. Gastaut and Hunter (1950) and Starzl et al. (1953) recorded these same slow waves in the intralaminar and midline nuclei of the thalamus. The discharges of the reticular formation may act on the caudate nucleus by way of projections which have been demonstrated (Nauta and Whitlock 1953 and others) between the head of the caudate nucleus and the intralaminar and midline thalamic nuclei.

From these experimental results one may postulate the existence of a thalamocaudate inhibitory system "branched-off in a side-chain" from the non-specific thalamocortical projection system—a system which may actively inhibit the reticular formation of the thalamus as well as that of the caudal brain-stem and thus prevent the discharge of cortical spikes at the same time as the muscular contraction.

In other words, the thalamocortical discharge of grand mal responsible for cortical spikes and for "release" of the reticular formation (with its consequent tonic phase) may be equally responsible for putting into action the inhibitory system whose slow waves rhythmically interrupt the discharge of spikes. The slow wave represents not a convulsive wave but a state of neuronal depression linked to a phenomenon of active inhibition (the braking wave of Jung, the phylactic wave of Grey Walter, the inhibitory wave of Gastaut).

In syncope, on the other hand, there is no such inhibitory mechanism, because the telencephalon is functionally excluded by anoxia, for which reason the tonic spasm is not broken up into a rhythmic clonic phase.

We conclude that the tonic anoxic seizures seen in syncope are not epileptic, and that the diagnosis can be made by careful clinical inquiry and with the aid of the E.E.G. This is particularly important because syncopal seizures are very common and represent a chapter in medicine which needs reconsideration.

Summary

An electro-encephalographic study of 100 patients complaining of syncope was made with, in the majority, simultaneous electrocardiography and electrodermography. Ocular compression was applied to each patient to produce an oculovagal reflex.

The E.E.G. was normal in all the patients before ocular compression. After ocular compression cardiac arrest was observed in 71 patients, and in 20 it lasted longer than 10 sec. and was then associated with the clinical and electrical manifestations of syncope. Two types of syncope were observed: immediate, within 1–5 sec. of compression; and delayed, within 20–70 sec.

With cardiac arrest lasting 3–6 sec. the only abnormal sign was desynchronisation of the E.E.G.—the classical response to a painful stimulus. With longer cardiac arrest (about 7–13 sec.) bilateral and synchronous slow waves appeared, often but not always accompanied by clouding or loss of consciousness. When cardiac arrest lasted more than about 14 sec., one or two generalised

clonic jerks appeared without affecting the E.E.G., followed by generalised tonic contraction resembling decerebrate rigidity and accompanied by complete "flattening" of the E.E.G. We believe that these seizures were due to cerebral ischæmic anoxia. A rhythmic clonic phase was not observed.

Syncope and grand mal are analogous in that activation of the brain-stem reticular formation is responsible for the tonic spasm seen in both conditions. This activation corresponds to liberation perhaps associated with direct excitation.

In epilepsy, however, the cortex is functionally active, whereas in syncopal seizures there is electrical silence, with no epileptic seizure discharge, because all the structures rostral to the brain-stem are functionally dead.

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USE OF BEMEGRIDE IN TERMINATING BARBITURATE ANÆSTHESIA*

B. D. WYKE
M.B., B.S. Sydney

SENIOR LECTURER, DEPARTMENT OF APPLIED PHYSIOLOGY, ROYAL COLLEGE OF SURGEONS OF ENGLAND, AND CLINICAL ASSISTANT, NEUROSURGICAL CENTRE, BROOK HOSPITAL, WOOLWICH, LONDON, S.E. 18

E. FRAYWORTH
M.D. Pecs, D.T.M. & H., F.F.A., R.C.S.

LECTURER, DEPARTMENT OF ANÆSTHESIA, HEELKUNDIGE UNIVERSITEITSKLINIEK, UTRECHT

BEMEGRIDE (β-ethyl-β-methylglutarimide, 'Megimide') reverses, to a large extent, the narcotic effects of barbiturates in laboratory animals (Shaw and Bentley 1952, Shaw et al. 1954). It is widely used in barbiturate poisoning to counteract the narcotic action of these drugs, usually with considerable success (Shaw and Shulman 1955, Shulman et al. 1955, Clemmesen 1956, Delay et al. 1956b, Louw and Sonne 1956, Pedersen 1956, Worlock 1956). It has usually been combined with amiphenazole (2 : 4-diamino-5-phenylthiazole hydrochloride, 'Daptazole') in such cases. But experimental work in the laboratories of the Royal College of Surgeons of England by Cass (1956) and Wyke (1957b) has amply demonstrated the efficacy of bemegride alone as a barbiturate antidote. As further animal studies by Wyke (1957b) have shown it to be the most effective of all available antidotes in terminating and reversing the narcotic effects of barbiturates given in anæsthetic doses, let alone in toxic amounts, it was decided to subject bemegride alone to an extended clinical trial in patients anæsthetised with barbiturates. Apart from short notes by Harris (1955) and by Bentel et al. (1956), its use as an anæsthetic antidote has not been reported so far, though such an antidote would be useful to the anæsthetist (Sellick 1955, Wyke 1957b).

Method

Fifty-two consecutive patients, ranging in age from 7 to 84 years, were anæsthetised by one of us by a technique similar in each case. We give no details of the method, because there was nothing unusual about it except that sufficient barbiturate was employed in each case to permit testing of the action of bemegride. Briefly, after premedication, anæsthesia was induced with intravenous thialbarbitone ('Kemithal') or thiopentone ('Pentothal'), the initial dose being roughly 10 mg. per kg. body-weight. All patients were intubated. Anæsthesia was maintained with nitrous oxide and oxygen, with supplemental doses of barbiturate. The total amount of thialbarbitone given in each case varied from 14 to 40 mg. per kg. body-weight (average 24 mg.) and of thiopentone, from 7 to 18 mg. per kg. body-weight (average 10·5 mg.). Thialbarbitone was given intravenously in 10% solution, and thiopentone in 5% or 2·5% solution.

Bemegride was given in repeated intravenous injections of 0·5% solution, the initial dose averaging 50 mg. (10 ml.). The total amount given in each case, per kg. body-weight, varied from 0·6 to 4·7 mg. (average 2·0 mg.). The interval between the last injection of barbiturate and the first injection of bemegride varied from just over an hour (when only a single dose of barbiturate had been given for induction of anæsthesia) to 5 minutes (when repeated barbiturate injections had been given). Administration of nitrous oxide was discontinued for at least 10 minutes before bemegride was given.

The effect of the antidote was estimated by the restoration of pulmonary ventilation, corneal reflexes, oropharyngeal reflexes, and spontaneous movements, and by noting the onset of returning consciousness judged by obedience to commands and awareness of the environment.

For control purposes a further consecutive series of twenty-five patients was anæsthetised by the same individual by a technique identical with that used for the test cases, except for administration of bemegride, and similar observations were made at the end of the operation. The dosage-rate of barbiturate in this control series was identical with that in the test cases.

Results

The findings leave us in no doubt that bemegride is an effective, safe, and clinically useful antidote to barbiturates employed as anæsthetic agents. It rapidly changes deep levels of anæsthesia to very light levels, as shown by increased pulmonary ventilation, return of corneal and oropharyngeal reflexes, and restoration of spontaneous movements. It does not immediately restore full awareness of the environment, but it does accelerate return of consciousness; and it eliminates the dangers of delayed postoperative recovery in patients who have had larger doses of barbiturate than usual, or who are shocked and

* Based on a paper presented at a meeting of the Dutch Society of Anæsthetists on May 18, 1957, at Utrecht.

so detoxicate the drug at an abnormally slow rate (Wyke 1957a).

Respiration

The first observable effect of the antinarcotic action of bemegride in the anæsthetised patient is an increase in pulmonary ventilation (fig. 1). Both depth and rate of breathing are increased, the depth sooner and more notably than the rate. The maximum respiratory rate resulting from injection of bemegride was reached within 10 minutes of the start in 80% of the cases, and within 5 minutes in 25%. Of patients given bemegride, 50% achieved a maximum respiratory rate within 20–25 minutes of the last injection of barbiturate. In contrast (fig. 2), in the control series not given bemegride but receiving a comparable dosage range of barbiturate, 50% of patients required 30–35 minutes to reach a maximum respiratory rate after the last dose of the anæsthetic. In other words, use of bemegride in this series increased the rate of recovery of respiratory function by some 40%.

Corneal Reflexes

Corneal reflexes, abolished by the barbiturate, return a little more slowly than does respiratory function (fig. 1). Thus 80% of our patients required a minimum of 18 minutes for return of their corneal reflexes after administration of bemegride was begun, and in only 10% had these reflexes returned within 5 minutes of the initial injection. Of the patients given bemegride 50% recovered their corneal reflexes within about 30 minutes of the last dose of barbiturate, and 80% within 40 minutes. In the control series (fig. 2) a similar proportion (50%) needed 60–65 minutes for return of their corneal reflexes; about 80 minutes elapsed before these reflexes had returned in 80% of the cases. In this series of cases, then, use of bemegride accelerated the rate of return of the corneal reflexes by just over 50%, and whereas in untreated cases abolition of the corneal reflexes took about 30 minutes longer to wear off than did depression of respiratory function, this interval was reduced to about 10–15 minutes if bemegride was given (fig. 1).

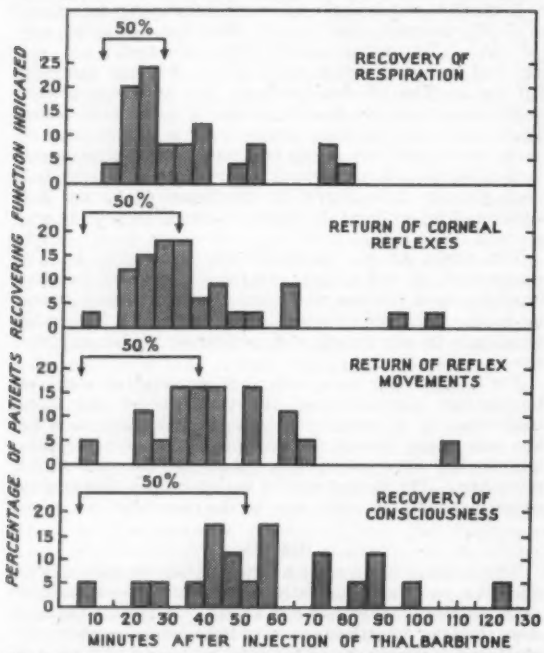

Fig. 1—Effect of bemegride in terminating thialbarbitone anæsthesia.

Note the sequence of events in the successive recovery of function, with shift of the peaks of the distribution-curves from left to right as they are inspected from above downwards. The distribution-curve for recovery of consciousness is almost a random one, indicating little specific effect of bemegride on this function.

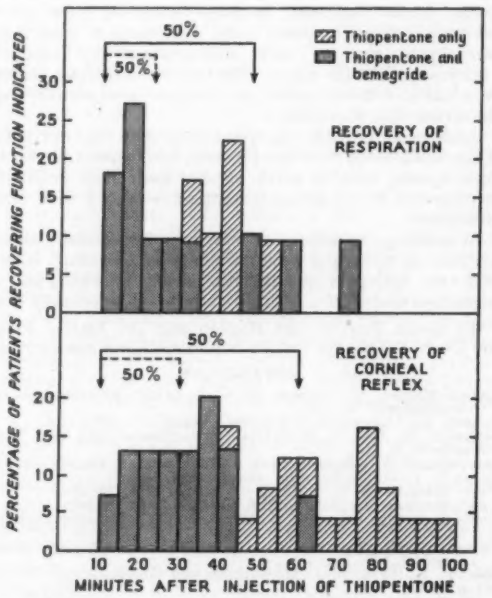

Fig. 2—Effect of bemegride in terminating thiopentone anæsthesia, tested in respect of recovery of respiration and recovery of the corneal reflexes. Hatched blocks indicate the patients who had no bemegride; stippled blocks indicate patients who had bemegride. Unbroken line=50% of the patients not receiving bemegride; intensified line =50% of the patients receiving bemegride.

Note the shift to the left produced in each set of curves by administration of bemegride.

Oropharyngeal and Somatic Reflex Responses

After the increase in pulmonary ventilation and return of the corneal reflexes, the oropharyngeal reflexes recovered, and the patient made reflex movements of his head and limbs in response to sensory stimulation (fig. 1). In the test cases, at least 35 minutes after injection of bemegride was needed by 80% of patients to show these reactions, only 10% doing so within 5 minutes of the initial injection of bemegride. An interval of 55–60 minutes after the last dose of barbiturate was needed for bemegride to induce recovery of these responses in the same proportion (80%) of cases; in 50% these functions returned in about 35–40 minutes after the last injection of barbiturate (fig. 1).

Thus if bemegride injections were begun within about 15 minutes of the last injection of barbiturate, 80% of patients maintained in moderately deep surgical anæsthesia—with depressed pulmonary ventilation, muscular relaxation, and absent oropharyngeal and corneal reflexes—were rapidly returned to a very light level of narcosis, with restoration of pulmonary ventilation (within 5–10 minutes), return of corneal reflexes (within 15–20 minutes), and recovery of reflex responses to gentle sensory stimulation (within about 30–35 minutes).

Recovery of Consciousness

In most cases consciousness is not fully regained within this period of 30–35 minutes after giving the bemegride, and the patient continues at a light level of narcosis from which he is rapidly roused by stimulation. In the test cases a minimum period of 55–60 minutes after injection

of bemegride elapsed before 80% of the cases were fully aware of their environment, and only one patient recovered consciousness in less than 10 minutes after a single injection of bemegride. After the last dose of barbiturate (fig. 1) 80% of the patients did not recover full consciousness for some 75 minutes, even though repeated injections of bemegride were given, commencing within 15 minutes or so; while some 50 minutes were required for 50% of the patients to recover. In other words, though all reflex functions were restored within about 30 minutes of starting the administration of bemegride, most patients remained very lightly narcotised for a further 45–60 minutes. We regard this as one of the most desirable features of bemegride as an anæsthetic antidote, for it means that the patient does not regain full consciousness until he is back in his own bed after the operation, and he remains amnesic for the period of immediate postoperative handling.

Toxic Effects

When large doses of bemegride are given to patients with barbiturate intoxication a variety of undesirable side-effects may arise, ranging from vomiting to convulsions (Shaw et al. 1954, Shulman et al. 1955, Clemmesen 1956, Kjær-Larsen 1956, Louw and Sonne 1956). If enough of the drug be given to normal subjects, the same effects may be seen at dosage levels lower than those needed to produce them in intoxicated patients (Delay et al. 1956b); and electroencephalographic studies in subjects who have not had narcotics have shown seizure discharges of brain-stem origin after bemegride (Delay et al. 1956a and b, Drossopoulo et al. 1956, Green and Fink 1957).

With the dosage range of bemegride used in this study, such disturbances were rare. The drug did not cause convulsions or vomiting. The only undesirable side-effect was restlessness, which developed in three cases within half an hour of the last injection of bemegride, and therefore before the patient regained consciousness. When this happens the stuporose patient begins to toss and turn in bed, and shows hyperreactivity to the sensory stimuli provided by handling him. Bursts of restlessness, or myoclonic jerking of the limbs, may be provoked by sudden, more intense stimuli, such as loud sounds or needle-pricks. This is readily controlled by giving the patient a little more barbiturate to damp down the excessive effects of the bemegride. In the three cases in this series, small intravenous injections of thiopentone terminated the restlessness and hyperreactivity.

Mode of Action

The results of this study, and in particular the sequence in which narcotically depressed functions recover (fig. 1), suggest certain inferences regarding the mechanism by which bemegride achieves its effects. These inferences receive further support from the electroencephalographic studies of Cass (1956) and Wyke (1957b), and from studies on narcotised and other subjects (Delay et al. 1956a and b, Drossopoulo et al. 1956, Green and Fink 1957). They lead to the conclusion that bemegride is not a pharmacological antagonist to barbiturates in the literal sense.

There is now much evidence (Wyke 1957a) that the anæsthetic action of barbiturates depends primarily on their interfering with activity in the reticulocortical activating system, which links the cerebral cortex and the reticular nuclei in the brain-stem. This reticular depression underlies the patient's diminishing contact with his environment, the muscular relaxation and reduction in reflex responses to sensory stimulation, and the diminution in pulmonary ventilation, which are such characteristic features of anæsthesia. Similar mechanisms are responsible for the parallel changes in the pattern of cerebral electrical activity that accompany barbiturate anæsthesia.

In the light of these facts the following data lead us to suggest that bemegride acts essentially as a reticular stimulant, whether or not barbiturates be present, leading to an increase in the level of reticulocortical and reticulospinal activation:

When given to normal subjects who have taken no narcotic it leads to increased pulmonary ventilation, augmentation of reflexes, and changes in cerebral electrical activity (Delay et al. 1956a and b, Drossopoulo et al. 1956).

When given in similar doses to epileptic patients or in larger doses to normal subjects, it produces seizure discharges in the electroencephalogram, followed by convulsions if still larger doses are given (Delay et al. 1956b, Drossopoulo et al. 1956, Green and Fink 1957).

When given to narcotised animals (Cass 1956, Wyke 1957b) or people it reverses the somatic manifestations of narcosis in the sequence described in this paper, with little or no accompanying change in autonomic functions (Delay et al. 1956b), together with acceleration of the electroencephalogram.

In still larger doses bemegride given to narcotised animals or patients (Shulman et al. 1955, Delay et al. 1956b, Kjær-Larsen 1956, Green and Fink 1957) produces seizure-discharges in the electroencephalogram and eventually convulsions.

In narcotised animals diminution in cortical excitability (tested by cortical stimulation) due to barbiturates is reversed by bemegride (Wyke 1957b).

All these changes can be terminated by further administration of barbiturate.

All the electroencephalographic changes, both paroxysmal and non-paroxysmal, evoked by bemegride are bilaterally synchronous and symmetrical.

There is no change in the blood-barbiturate content during or shortly after the period when bemegride is exerting its effects.

We therefore suggest that bemegride is a direct reticular stimulant, facilitating transmission through the reticulocortical and reticulospinal systems, and counterbalancing the depression of this system that exists during barbiturate narcosis. The manifestations of narcosis are reversed for as long as enough bemegride remains in the blood and in the tissue-fluids of the central nervous system.

Conclusion

If anæsthetists agree that it is important for them to have an agent to arrest or reverse the processes of narcosis once begun, as well as to control its progress, then we would suggest that in bemegride such an agent is to hand for use with barbiturate anæsthesia (or poisoning). With properly controlled doses, it rapidly reverses the narcotic depression of neurological function that results from administration of barbiturates, without immediately producing full recovery of consciousness. It is effective at deep planes of surgical anæsthesia, and at the still deeper levels of narcosis that obtain in cases of barbiturate poisoning. Further, bemegride is a safe antidote for use in anæsthetic practice, for the doses that are effective in barbiturate anæsthesia fall far short of those required to produce undesirable side-effects. For these reasons, then—reasons derived from appraisal of the results of many laboratory and clinical experiments—we have no hesitation in recommending bemegride as a safe and effective barbiturate antidote for use in anæsthetic practice, should one be required.

Summary

The results of a clinical trial of bemegride in terminating barbiturate anæsthesia are reported.

Bemegride accelerates considerably recovery of respiratory function, corneal reflexes, and oropharyngeal and somatic reflex responses. It has little specific effect on full recovery of consciousness, although it does diminish the depth of unconsciousness.

Toxic effects of bemegride are rare with the doses required to produce these effects.

Bemegride appears to act primarily as a stimulant to the reticular nuclei of the brain-stem.

Thanks are due to our surgical colleagues for their cooperation during this investigation, and to Dr. Noel Cass for his help in planning the study.

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TRICHOMONAS VAGINITIS:

CLINICAL TRIAL OF A MIXTURE OF AN ANTISEPTIC WITH LOCAL ANÆSTHETICS

H. C. STEWART
M.D.Cantab., PH.D.Lond, M.R.C.P.
READER IN PHARMACOLOGY IN THE UNIVERSITY OF LONDON.

W. HOWARD HUGHES
M.D.Lond.
READER IN BACTERIOLOGY IN THE UNIVERSITY OF LONDON.
AT ST. MARY'S HOSPITAL, LONDON, W.2

E. GWYNNE THOMAS
O.B.E., V.R.D., M.D.Lond., M.R.C.P.
DIRECTOR OF THE VENEREAL DISEASES DEPARTMENT.

W. C. W. NIXON
M.D.Lond., F.R.C.S., F.R.C.O.G.
PROFESSOR OF OBSTETRICS AND GYNÆCOLOGY IN THE UNIVERSITY OF LONDON.
AT UNIVERSITY COLLEGE HOSPITAL, LONDON, W.C.1

THE Rheims symposium (1957) on infestation with *Trichomonas vaginale* makes any other survey of the literature unnecessary. The conclusions emphasise the limitations of the methods of treatment now used. In the present paper we describe a new formula and compare its effects with those obtained with two standard preparations.

Certain difficulties have previously been noted in testing remedies for trichomonas infestation:

1. Drugs have appeared to lose their effects. This is commonly attributed to the development of resistant strains and their dissemination throughout the population.

2. It is not regarded as a venereal disease, though it may be a venereal infection, and there is a reservoir in the male partners of many of the patients. Thus it is often impossible to distinguish failure of therapy from reinfestation.

3. The people available for clinical trials are chiefly those attending special clinics for trichomonal vaginitis, either alone or in combination with venereal diseases. This type of woman is difficult to follow up because she tends to be unreliable or because she is ashamed of having to attend such a department and will stop as soon as her symptoms are better. The interpretation of the motives for defaulting is therefore not easy, and in compiling our tables defaulters have been discarded.

Because a relapse may be indistinguishable from a reinfestation we decided to regard each infectious incident as a unit, whether or not the patient had had any previous attacks of vaginitis. Our criterion of cure has been the absence of viable organisms on microscopical examination; but, owing to the confusion between relapses and reinfestations we use the term "control" rather than "cure."

In comparing two or more treatments, their appropriate duration must be determined in the first instance empirically. An arbitrary comparison based on the number of days or of treatments could be misleading if the optimum duration of the respective courses is different. The criterion of failure here is that the physician thinks that a different treatment should be substituted because microscopical evidence of infestation is still present. Thus, some of the patients will have been cured in a week, while others will have been given as much as six weeks' treatment, before the drug has been deemed totally ineffective. This gives the maximum chance to any agent to demonstrate its efficiency; but the duration of treatment in successful cases has significance because the necessity for protracted medication is a warning that drug resistance may be developing.

Origin of the Preparation

In cases of certain skin lesions an antipruritic cream, 'Locan,' was found to be giving results better than could be accounted for by the known action of its various ingredients in allaying irritation and so preventing excoriation. It seemed to accelerate healing of secondarily infected skin lesions. Investigation of this action established that some of the local anæsthetics used in the cream were antiseptics (Hughes and Stewart 1957).

Further tests showed that the antiseptic effects of the cream could be greatly enhanced by the addition of some other antiseptics with which there was true synergism. The combination was found to be highly effective in vitro against arsenical-resistant strains of *T. vaginale* and *Candida albicans* as well as the usual bacterial pathogens. It was decided to test pessaries containing this combination in known vaginal infections. The final experimental formula was:

FORMULA OF LOCAN PESSARIES
Amethocaine gr. 1/6.
Amylocaine gr. 1/12.
Solution of benzalkonium chloride *B.P.C.* m 1/2.
Lactic acid gr. 1/2.
Lactose gr. 4.

The activity of this preparation was titrated against the laboratory cultures, because it had been noticed that certain bases or other inactive ingredients could neutralise the action of the drugs.

Clinical Trial

The results of treatment with locan pessaries were compared with the results obtained in a series of cases attending the clinic immediately before the trial. All patients with trichomonas vaginitis (with or without any additional infection) were included, except those who were professionally promiscuous.

The controls were unselected and consisted of 66 patients taken consecutively from those attending the clinic.

Courses of Treatment

Locan.—Initially the patients were all given the same course of one pessary night and morning for six days. They were then re-examined and those still infested were given further courses of the same duration. The instructions given to the patient were:

(1) Insert the pessary as high as possible up the front passage. This should be done night and morning.

(2) The easiest position for this insertion is when you are lying on your back with the knees drawn up.

(3) If you need to douche for any purpose, use warm water with only salt or bicarbonate of soda added. On no account use any antiseptics. After douching insert another pessary always, in addition to those inserted night and morning.

(4) The pessary should be inserted not before, but after intercourse.

The patients were advised not to have intercourse during treatment.

Acetarsol.—Two pessaries at night only, for fourteen days.

'*Penotrane*' (phenylmercuric dinaphthylmethane disulphonate).—One pessary at night for fourteen days.

Laboratory Investigation

Test of control of the infestation was by direct microscopical examination. The presence of other infections was established by stained films and by culture. All patients not controlled by the first course of treatment, relapsing or being reinfested later, were examined also for evidence of rectal carriage.

Results

Three-quarters of the patients were controlled by a single course of locan, and with very few exceptions two courses controlled the rest.

Table I compares locan with penotrane and acetarsol. It will be seen that the proportion of failures, however

TABLE I—RESULTS OF TREATMENT BY LOCAN, PENOTRANE AND ACETARSOL

The first three columns are strictly comparable. The fourth is not, since the period of follow-up for the first two drugs was longer; there was no significant difference between the relapse-rates with acetarsol and locan. In the fifth, the first two figures are added together, since most of the patients received both drugs at different times. The default is debited to the drug given last.

	Incidents*	Controlled	Failed	Relapses	Defaulters/ Patients
Penotrane	72	47	25	27 (37%)	5 } 14/66
Acetarsol	79	54	25	21 (26%)	9 }
Locan ..	68	68	0†	19 (28%)	16/68†

* An incident is either a primary infestation or a further attack.
† At the time of concluding the trial, 12 patients were still under treatment, some of whom may default or fail.

calculated, is very much less for locan, indicating that resistant strains to this agent were not encountered during this trial. With acetarsol and penotrane the figures were 32% and 34% respectively. Table II gives the sensitivities, as judged clinically, in two contrasting but typical pairs of cases taken from the control group.

In cases 1 and 3 the pattern is typical of failing chemotherapy. The initial strain responds well to the drug given, and a clinical cure is obtained. At some later date symptoms recur; the same drug is used and fails. The conclusion is that this is a relapse, and that small numbers of resistant mutants were selected by the early therapy. The same story is repeated in these cases when a different drug is substituted. That this interpretation may be unfair to the chemotherapeutic agent and unnecessarily pessimistic in outlook is illustrated by the other members of the pairs (cases 2, 4) where initially resistant strains are followed subsequently by strains which are found to be sensitive to the drug which previously failed. Further evidence that this was an entirely fresh episode is provided by the concomitant attack of gonorrhœa in case 2.

The rate of cure by locan is shown in table III. The patient who needed a third and a fourth week's course

TABLE II—EVIDENCE FOR CHANGE OF STRAIN IN TYPICAL RELAPSING CASES

Case	Date	Acetarsol	Penotrane	Remarks
1	Jan. 21, 1954	Sensitive	..	..
	April 7, 1954	Resistant	Sensitive	..
	Feb. 8, 1957	..	Resistant	..
2	Feb. 29, 1956	Resistant	Resistant	Cured by oxytetracycline
	Oct. 31, 1956	Sensitive	..	Accompanied by gonorrhœa
	Nov. 26, 1956	..	Sensitive	..
3	Aug. 7, 1954	Sensitive	..	..
	Oct. 7, 1954	Resistant	Sensitive	..
4	April 5, 1955	Resistant	Sensitive	..
	June 10, 1955	Sensitive	Resistant	..

TABLE III—CURE-RATE OF INCIDENTS BY LOCAN

Courses (weeks)	1st	2nd	3rd	4th
Successful control ..	58	8	1	1
Failed	10	2	1	0

was the only one in whom difficulties were met, where it was reasonably certain that she was not being constantly reinfested. Success with the fourth course followed an increase in the dose from two to three pessaries a day. The distribution of relapses among these patients, followed up for a period of three months, are shown in table IV. After locan, most of the patients had no further trouble, but some were reinfested as soon as treatment was stopped.

The lower half of the table indicates that there is no particular interval between the achievement of control and the reappearance of infestation, again suggesting reinfestation rather than relapse. At least 3 patients in each series had attacks of gonorrhœa at the same time as the relapses.

Relapses and Reinfestations

Although some promiscuous patients could be excluded from the trial, not all the rest had only one partner during the period of observation. In only a few patients can one be reasonably certain that there was no chance of reinfestation from a male partner at all, and in some the husband was clearly the carrier. In no case after a patient had been treated and relapsed were trichomonads recovered from the rectum. The interval between the apparent cure and the reappearance of the organism varied from one to ten weeks and did not seem to be related to the menstrual cycle once the condition had been controlled.

An important point was to discover whether further courses of treatment were less successful than the first course. There was no evidence of this with locan. Resistant strains appeared after treatment with penotrane, and possibly in 2 cases after acetarsol.

TABLE IV—(PATIENTS FOLLOWED FOR THREE MONTHS)—RELAPSES AND REINFESTATIONS AFTER LOCAN

	Distribution				
No. of relapses	0	1	2	3	4
No. of patients ..	55	8	1	3	1*

Interval between control and reinfestation									
Interval (weeks) ..	1	2	3	4	5	6	7	8	9
No. of patients relapsing	4	3	1	7	0	3	0	1	1

* This patient was clinically reinfestated seven times. Negative laboratory findings were obtained only three times. Accompanying these were two distinct attacks of gonorrhœa: she also became pregnant.

Other Organisms

The presence of other organisms, whether pathogenic or saprophytic, did not seem to influence the course of the treatment. Where gonorrhœa was present it was treated at the same time as the trichomonal infestation, without any effect on the treatment of the latter.

When the pessaries were discontinued there was no immediate restoration of the normal flora. Döderlein's bacillus did not reappear, and in general the cultures reflected the vulval and anal flora, with various coliforms and *Staphylococcus albus* as the first organisms to colonise the site.

Subjective Symptoms

The relief of irritation was striking, and most patients expressed their gratitude. For an unselected population attending a special clinic they were good at attending for the follow-up examination.

The microscopical cure was not always followed by the disappearance of symptoms, nor was the normal appearance of the vagina restored in long-standing cases which had been heavily secondarily infected. Only 1 patient, however, complained of any symptom which she attributed to the treatment itself. This was a Negress with irritation of the vulva; she continued treatment and was controlled by the second course.

Moniliasis

Candida albicans was isolated in 6 cases initially and in a further 4 at the end of one course of treatment. In these cases, subsequent treatment was effective against both pathogens.

Discussion

The locan preparation used in this trial is a provisional formula which could be modified if experience shows that the organism can become resistant to it. The fact that it has three active ingredients, each of which inhibits the organism in vitro, should insure against this as does the triple attack on the tubercle bacillus. In the treatment of such a condition æsthetic considerations cannot be ignored, since the cooperation of the patient depends on them. There are immense advantages in a simple local application which does not stain garments or cause any other inconvenience, and at the same time relieves the intolerable irritation almost at once.

Our own experience suggests that earlier trials of this sort did less than justice to the drug used, partly because the investigators had great difficulty in determining what they should accept as a cure. If disappearance of the organism from the vagina is the only acceptable standard of cure, then many difficulties will disappear. A standard which demands that the patient should not subsequently have a further attack of vaginitis, when she has not changed her male partner or social habits, is entirely unrealistic. A series of infectious incidents, separated by periods of clearance, may reasonably be regarded as entirely independent.

If we regard all incidents in this way, it appears that locan is effective against all the strains encountered, acetarsol against only two-thirds, and penotrane against rather less. The evidence that resistance develops during treatment with penotrane and acetarsol is not convincing, because the strain recovered during a further incident may be either more or less sensitive (table II). Moreover, the proportion of resistant strains is the same now as it was twenty years ago (Haupstein 1935, Collis 1936). Pessimism about resistance necessarily emerging may not be justified, and results indicate that there is a natural variation in sensitivity.

Tables I, III, and IV show clearly the superiority of locan to acetarsol and penotrane. In the control group a number of other agents were used spasmodically; of these only oxytetracycline gave results as good as acetarsol (of 10 incidents 7 were controlled).

Haupstein (1935), Assinder (1936), Collis (1936) Meigs (1942), and Platt et al. (1951) all thought that treatment at home was ineffective, and inpatient treatment desirable. In Haupstein's experience 48% of outpatients defaulted. But in our series only 22% defaulted; with locan pessaries no patient had any difficulty in treating herself.

It seems reasonably certain that locan will control the individual infestation with trichomonas. Where laboratory control is not available, two weeks' treatment should be given. Neither this nor any other preparation can be expected to prevent reinfestation once treatment has been stopped. A patient who has a reinfestation will continue to relapse unless she is given a supply of pessaries to treat herself after each coitus. A period of about three months is needed for her husband's carrier state to die out. Prophylaxis of this sort merits further investigation. Treatment of the male has so far always been ineffective (Catterall and Nicol 1957).

We are investigating the value of locan in moniliasis.

Summary

In the treatment of trichomonas vaginitis, the efficiency of 'Locan' pessaries (containing benzalkonium chloride, amethocaine, and amylocaine) was compared with that of acetarsol and 'Penotrane.'

Primary infestations were controlled in all cases, the usual duration of treatment being a week; only 16% needed a second week's treatment. Occasional patients needed up to four weeks with increased dosage before control was obtained. The failure rate in acetarsol-treated cases was 32%, and in penotrane 34% after a course of two weeks' treatment.

Reinfestation was equally common with acetarsol and locan. With penotrane reinfestation was commoner, and there may be true relapses with this drug.

Reinfestations were controlled by locan as readily as the first attack. Resistant strains were not found.

No local treatment of the female alone can eradicate the disease from the community and prevent reinfestation.

Our thanks are due to Allied Laboratories Ltd., for the 'Locan' pessaries used.

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ADDUCTION INJURIES OF THE ELBOW-JOINT

W. D. GRAHAM

M.B. Edin., F.R.C.S., F.R.C.S.E., F.R.F.P.S.

SENIOR ORTHOPÆDIC REGISTRAR, THE MIDDLESEX HOSPITAL, LONDON, W.1

ALMOST all fractures about the elbow-joint are caused by the arm being forced into valgus—usually the result of a fall on the outstretched hand or of direct injury to any of the bony prominences. Adduction injuries are rare, because any strain which forces the elbow into the adducted position tends to be absorbed by the shoulder or distributed to the side of the body when the arm comes to the side; and thus dissipated. Gross fracture-dislocations due to massive forces applied to the lateral aspect of the elbow are sometimes seen and are the result, usually, of "knock-down" accidents or serious industrial injuries. Here I intend, not to discuss the severe fracture-dislocation, but to describe the simpler injuries due to pure hyperadduction of the elbow.

No reference is made to this type of injury in the standard works on fractures and I can find no recent article in English describing these injuries.

There seem to be three distinct types of lesion:

Type 1.—(*a*) A tear of the lateral collateral ligament of the elbow (fig. 1) or (*b*) avulsion of a flake of bone from the lateral epicondyle of the humerus by the lateral collateral ligament (fig. 2).

Type 2.—A depressed fracture of the medial aspect of the coronoid process of the ulna, with or without an associated lateral collateral ligament injury (fig. 3).

Type 3.—A fracture of the trochlea at its junction with the capitellum (associated with contusion of the ulnar nerve) (fig. 4).

Adduction injuries of the elbow are rarely recognised as such, and lesions of the lateral ligament may not be appreciated unless the joint is examined carefully with the possibility of the diagnosis in mind.

Adduction injuries are uncommon, and the results of treatment are difficult to assess in the light of such limited experience.

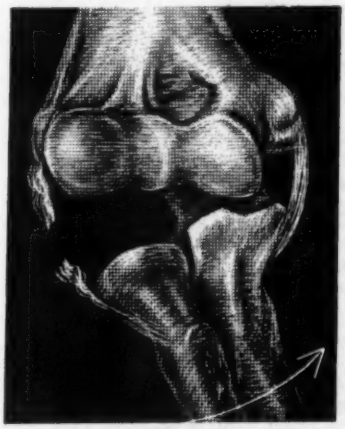

Fig. 1—type 1a.

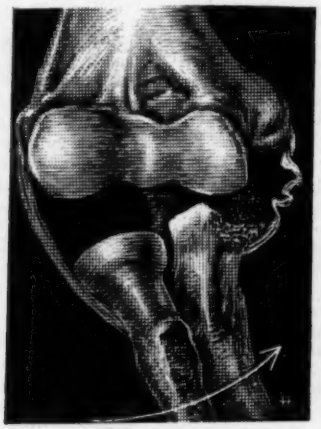

Fig. 3—type 2.

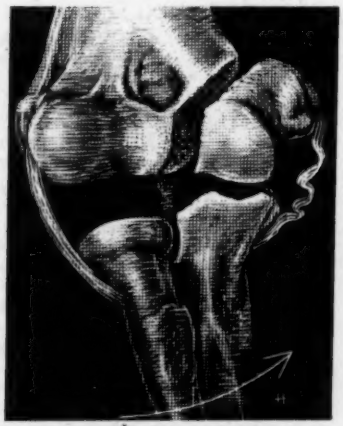

Fig. 4—type 3.

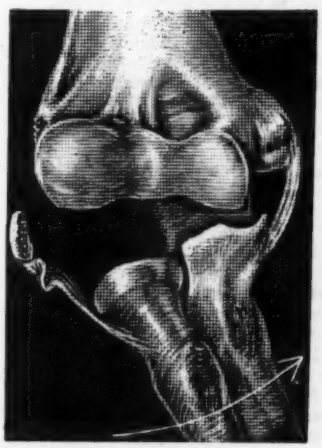

Fig. 2—type 1b.

Case-reports

Case 1.—A man, aged 22, was tackled at rugby football and his right elbow forced into adduction; his whole body-weight was taken on the arm, which was hyperextended at the shoulder. There was a large hæmarthrosis of the elbow-joint, which was unstable to a varus strain. Attempted extension of the wrist and fingers caused pain in region of the lateral epicondyle. Tenderness was greatest over the lateral epicondyle. Radiographic examination showed no evidence of bony injury.

Treatment consisted in aspiration of the hæmarthrosis and immobilisation of the joint at a right angle in a plaster-of-paris splint for three weeks, then active exercises for three months. The result was a return to full movement in six months, with no residual disability.

Case 2.—A woman, aged 57, slipped while going down steps. She could not describe the exact mechanism of the injury, but she said that she fell on top of her arm while it was extended at the shoulder. The injury was similar to that in case 1 but when the radiographs were examined closely, minute flakes of bone were seen at the humeral attachment of the lateral collateral ligament.

Treatment was on the same lines as in the previous case. In six months there was full movement apart from the last ten degrees of extension.

Case 3.—A woman, aged 46, slipped while crossing the road carrying a shopping-basket in the right arm. She fell over the arm, which acted like a pole in a pole vault, but gave way at the point of maximum strain. Her main complaint was of pain on the medial aspect of the elbow. The elbow was unstable to varus strain. Radiographs showed a crush fracture of the medial aspect of the articular surface of the coronoid process of the ulna. In this case the lateral collateral ligament had remained intact, acting as a hinge as the elbow adducted.

Treatment consisted in aspirating the hæmatoma and supporting the arm with the elbow at a right-angle in a plaster-of-paris splint for three weeks, when physiotherapy was begun. Recovery was full apart from the last few degrees of extension, which were lacking six months after the injury.

Case 4.—A woman, aged 55, slipped while crossing the street. She could not describe the exact mechanism of the injury, except that she fell on the arm and it crumpled up underneath her. The elbow was the seat of a gross hæmarthrosis, and there was instability to varus strain. There was hypoæsthesia of ulnar distribution, but no evidence of motor-function impairment. Radiographs showed that the trochlea had been punched off and rotated through ninety degrees.

The fracture was exposed at operation through a posterior approach. The ulnar nerve was seen to be severely contused. The fragment of bone consisted of almost the whole of the trochlea and medial epicondyle of the humerus with the attached common flexor origin. The muscular attachment had rotated the fragment through ninety degres. Reduction was satisfactory and was maintained by a transversely placed screw. The limb was immobilised in a plaster-of-paris splint. It is too early as yet to assess the result of treatment in her case.

Mechanism of the Injury

The mechanism of these injuries is exactly comparable to that of the more common abduction lesion of the elbow. The integrity of the lateral collateral ligament is responsible for the bony damage, and, if it ruptures early in the abnormal movement, bony damage is unlikely: the joint will merely open out, pivoting on the articular surfaces. If the ligament remains intact, however, abnormal movement must crush the articular surfaces together and fracture the underlying bone.

Summary

Four cases of an uncommon injury to the elbow are described. It is suggested that they are due to pure adduction strain.

Three types of injury are described: a tear of the lateral collateral ligament or avulsion of the bone to which it is attached; fracture of the coronoid process of the ulna; and fracture of the trochlea.

". . . it is obviously far more important to ensure that a solution of penicillin is of the correct potency than to correct a 10% deficiency in the amount of ammonia contained in sal volatile. Yet practically all the drug sampling in the country is directed towards the cure of minor faults of composition in 'household' articles such as ammoniated tincture of quinine, cough mixture or Blaud's pills, while suppliers of phenobarbitone, sulphaguanidine or promethazine tablets enjoy an almost complete immunity from inspection. This is surely not the intention of the framers of the Food & Drugs Act, but it is evident that some defect exists in the application of legislation to the practical problems of sampling"—H. H. BAGNALL, city analyst, Birmingham, in his report for 1956.

SIGNIFICANCE OF WATERBRASH IN DYSPEPSIA

F. LEES*
M.B. Sheff., M.R.C.P.
FORMERLY MEDICAL REGISTRAR
F. D. ROSENTHAL
M.D. Lond., M.R.C.P.
SENIOR MEDICAL REGISTRAR
THE ROYAL INFIRMARY, SHEFFIELD

WATERBRASH, as a symptom of diagnostic value, is often neglected. There is confusion about its definition and descriptions vary. Allbutt (1897) said that saliva ran from the mouth or was swallowed frequently, and accumulated either in the stomach or in the lower œsophagus. It was ejected in considerable quantities as a nearly colourless, slightly alkaline, opalescent fluid. He included waterbrash in descriptions of pyrosis. Saville and Warner (1939) described a profuse flow of saliva during the night that gave rise in the morning to the vomiting of clear alkaline fluid. They explained that this was not true vomiting, though it might be preceded by retching. Hurst (1946) wrote that at a certain interval after a meal an uncomfortable sensation of constriction appeared beneath the lower end of the sternum. This might be accompanied by profuse salivation. It was relieved by bringing up a few mouthfuls of clear fluid, like water, which might contain mucus but no food. It rose into the mouth with no effort or nausea. It came from the œsophagus, not the stomach. It was alkaline and had all the characters of pure saliva. Dorland and Miller (1947), however, referred to the symptom as pyrosis, burning. Palmer (1947) described the symptom as a rather rare combination of excessive salivation and acid regurgitation. Dunlop et al. (1953) said that waterbrash consisted in the outpouring of dilute saliva, which suddenly filled the mouth.

The significance of waterbrash has been variously estimated. Hutchinson (1928) and Hurst (1946) noted its association with duodenal ulcer, and Saville and Warner (1939) with gastritis, peptic ulcer, and many dyspeptic conditions. Bockus (1944) did not mention the symptom in his textbook of gastro-enterology. Chamberlain (1952) said that, like heartburn, it was of little significance. Dunlop et al. (1953) thought that it arose at intervals in every form of organic gastric disease. Little importance has been accorded to the symptom and its prevalence does not seem to have been studied.

The significance of waterbrash seems to be in doubt. We have therefore investigated its prevalence and its association with dyspepsia of various causes.

We have accepted the sudden filling up of the mouth with tasteless or salty clear fluid as waterbrash. In most of our cases the fluid seems to have come from the œsophagus, but in a few it was simply a filling up of the mouth with saliva. The following are typical descriptions of the symptom:

(1) During attacks of pain the mouth suddenly fills with water.
(2) Waterspasms with fluid running out of the mouth, especially during the night.
(3) Frothy waterbrash after meals, a salty water comes into the mouth.
(4) Waterbrash wakes him at night; the patient thinks he will be sick but is not.
(5) Gushing of water from under the tongue tasting like white of egg.
(6) Fluid like saliva comes up very fast and he swallows it.
(7) A tight feeling in the stomach followed by water coming up into the mouth.
(8) Waterbrash before vomiting.
(9) A sweet saliva, watertones.

* Present address: Department of Neurology, The Manchester Royal Infirmary, Manchester, 13.

Inquiry into its Significance

Our patients all attended a gastro-enterological clinic, usually for the first time. Having dyspepsia, they were questioned carefully about waterbrash. The questions were framed to avoid suggesting the symptom to the exclusion of others. They were asked "Does any watery fluid ever come into your mouth?" Those who had waterbrash had no difficulty in describing it, even if they had it rarely. It was easy to distinguish from acid regurgitation, vomiting, or the production of sputum. The descriptions were recorded before the results of barium studies were known.

Two groups of patients were investigated, 100 consecutive cases of dyspepsia and 100 consecutive cases of waterbrash.

Group I (100 cases of dyspepsia)

Dyspepsia was thought to be functional if the symptoms were unlike those of peptic ulcer and a barium meal was normal. Patients with typical ulcer dyspepsia in whom barium studies failed to show an ulcer have been recorded separately as "peptic ulcer (barium meal negative)". Our experience has been that many such patients subsequently prove to have peptic ulcers.

Waterbrash was nearly five times as common in duodenal ulcer, and nearly three times as common in gastric ulcer, as in functional dyspepsia (see table). The incidence in functional dyspepsia was 9%, while in the three "organic" groups it was 39%.

WATERBRASH IN 100 CONSECUTIVE CASES OF DYSPEPSIA

Diagnosis	Cases	Cases with waterbrash
Duodenal ulcer	39	16 (41%)
"Peptic ulcer (barium meal negative)"	19	8 (42%)
Gastric ulcer	8	2 (25%)
Functional dyspepsia	34	3 (9%)

The similar incidence of waterbrash in duodenal ulcer and in "peptic ulcer, barium meal negative," seems to support our diagnosis in the latter group.

Group II (100 cases of waterbrash)

In 66 of these cases a radiologically demonstrable gastroduodenal lesion was found, and in 85 such a lesion was thought to be present. Only 15 had functional dyspepsia. 45 of the patients with waterbrash had a proven duodenal ulcer.

The diagnosis in group II were:

Duodenal ulcer 42	Gastric and duodenal ulcer 3
"Peptic ulcer (barium meal negative)" 19	Carcinoma of stomach 3
Gastric ulcer 17	Hiatus hernia 1
	Functional dyspepsia 15

Functional dyspepsia with waterbrash.—Of the 15 patients in group II, 6 had heartburn as well as waterbrash. Waterbrash was felt in 3 patients during bilious attacks of a migrainous type, and in an alcoholic patient before vomiting. In 1 woman it was the only symptom.

We noticed that when waterbrash woke the patient at night and when it was not associated with vomiting its significance was enhanced and usually indicated an ulcer. In the majority of our cases the symptom of waterbrash was elicited only by direct questioning, as it was usually overshadowed by other more annoying symptoms.

Summary and Conclusions

Waterbrash consists in the sudden filling of the mouth with tasteless or salty clear fluid. It is not vomiting or pyrosis.

More than 40% of our patients with duodenal ulcer had waterbrash.

Waterbrash was uncommon in functional dyspepsia. Its presence heavily weighed the diagnosis in favour of peptic ulceration.

The symptom of waterbrash had usually to be elicited by direct questioning.

We wish to thank Dr. H. P. Brody for his encouragement and for permission to study the above patients who were under his care.

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THE SENSITISING POWER OF DIPHTHERIA PROPHYLACTICS IN RELATION TO POLIOMYELITIS

S. BEN-EFRAIM*
M.Sc., Ph.D. Jerusalem

D. A. LONG
M.D. Lond.

From the National Institute for Medical Research, Mill Hill, London

IN their report on Poliomyelitis and Prophylactic Inoculation the Medical Research Council's Committee on Inoculation Procedures and Neurological Lesions (1956) state that injection of diphtheria prophylactics predisposes the recipient to paralysis and does not, as was previously supposed, act merely by determining the site of the paralysis. They found that the risk varied with the prophylactic used, being greatest with alum-precipitated diphtheria-pertussis and least with toxin-antitoxin floccules (T.A.F.) and formol toxoid (F.T.). Alum-precipitated toxoid (A.P.T.), aluminium-phosphate-precipitated purified toxoid (P.T.A.P.), and mixed non-alum-precipitated prophylactic occupied an intermediate position, and plain pertussis vaccine appeared to be relatively safe. The risk persisted for about a month after inoculation; a series of inoculations had no cumulative effect. As in previous work, the site of inoculation became the site of paralysis, and this was true whether the injection had been given subcutaneously or intramuscularly. The Committee point out the practical importance of these facts but consider the way in which inoculation acts to be a matter for conjecture.

For many years the nature of immune and allergic responses to diphtheria antigens have been studied in this laboratory. The purpose has been primarily to provide a rational basis for the standardisation of all types of diphtheria prophylactics but also to see if it is possible to increase the immunising power and, at the same time, to decrease the sensitising power of diphtheria prophylactics. We were struck by the apparent correlation between our figures for the sensitising power of the various diphtheria prophylactics and their reported ability to predispose to paralytic poliomyelitis. Diphtheria prophylactics which have a low sensitising power in guineapigs are associated with a low incidence of paralysis in man. In this paper we report a method of assaying hypersensitivity to diphtheria toxoid and describe the evidence supporting this analogy.

Methods

Albino guineapigs of the Hampstead strain weighing 450–750 g. were used. In any one experiment the range in weights was less than 100 g. Groups of 15 animals were injected in the adductor muscles of the right leg with one of the following:

(1) international standard F.T.;
(2) international standard A.P.T.;
(3) laboratory standard F.T.;
(4) laboratory standard A.P.T.;
(5) preparations, typical of those in current clinical use, of F.T., T.A.F., A.P.T., P.T.A.P. and pertussis vaccine alone, or mixed with F.T., or mixed with A.P.T.

The doses of antigen were those laid down in the Therapeutic Substances Act Regulations for testing antigenic potency. (2·5 Lf of soluble or 1·9 Lf of adsorbed toxoid, each in a volume of 1 ml. of physiological saline solution, were injected. The dose of T.A.F. was 0·1 ml. in 1 ml. of physiological saline solution.) Pertussis vaccine (20 thousand million cells) was added to appropriate antigens so that this number of organisms was injected, together with the antigen, in a constant volume of fluid (1 ml.).

Assay of Hypersensitivity

Twenty-eight days later, sensitivity to diphtheria toxoid was measured by a method similar to that devised in this laboratory for the assay of tuberculin (Long and Miles 1950).

The method is based on the fact that the diameter of the intradermal reaction to diphtheria toxoid in sensitised guineapigs is directly proportional to the logarithm of the dose of toxoid injected in a constant volume of liquid. These findings have been confirmed in sensitised guineapigs over a wide range of doses of diphtheria toxoid, and they apply both to the immediate (Arthus-type) reaction measured four hours after the injection of toxoid, and to the delayed (tuberculin-type) reaction measured 24 hours after the injection of toxoid. Although the total damaged measured at 24 hours is mainly due to a tuberculin-type reaction, this is preceded by an Arthus-type reaction. Hence the final area of inflammation is due to an accumulation of mixed allergic reactions (see Pappenheimer 1955) and might be termed total allergic damage at 24 hours.

In each experiment the degree of sensitivity to toxoid was assayed against a standard toxoid (international or laboratory) and against a standard A.P.T. (international or laboratory). Both were included because of the poor sensitising properties of F.T.

In each experiment a group of non-sensitised guineapigs was included as a safeguard against the theoretical possibility that the toxoid might undergo reverse change to toxin and thus invalidate the assay.

The degree of sensitivity was based on the reaction after 24 hours of the skin to the test allergen—the laboratory standard test F.T. (E.3346).

The dose varied from 2·5 Lf to 40 Lf in 0·2 ml. of physiological saline solution. The large doses are used for the assay of hypersensitivity of a low degree, such as that induced by soluble antigens. In such experiments the mean responses to the doses fall approximately on a straight line. Such assays yield data susceptible to the standard methods of regression analysis (Fisher 1947). By such means it is

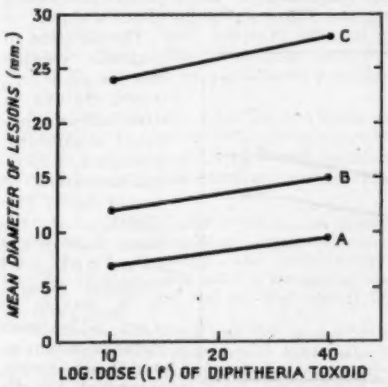

Fig. 1—Dose responses to F.T. in guineapigs: A, non-sensitised controls; B, immunised with F.T. 2·5 Lf twenty-eight days earlier; C, immunised with F.T. 2.5 Lf and pertussis vaccine 20,000 million organisms.

* Visiting Fellow from the Israeli Institute for Biological Research, Ness-Ziona, Israel.

possible to prove that in each test the dose-response lines are substantially straight and parallel to one another, and to assess whether difference in position is significant. Although the method permits a precise numerical estimate of hypersensitivity, the effects obtained in all the experiments referred to here were so large that they were obvious on sight (see, for example, fig. 1).

Assay of Allergen Content of Toxoid

After soluble antigens had been shown to be poor sensitising agents unless pertussis vaccine had been added, and adsorbed antigens had proved to be powerful sensitising agents, the question arose whether antigens that sensitised well caused more damage than did antigens that sensitised poorly, when injected into a fully sensitised guineapig; or whether such damage was solely a measure of the allergen content of the antigen (diphtheria toxoid) and was independent of adsorbing agents of vaccine.

A method was devised that differs only in detail from those described for the assay of tuberculin and P.P.D. (Long et al. 1954) (see *British Pharmacopœia* Addendum 1955, p. 84) and for the assay of diphtheria (Schick) toxin (Gerwing et al. 1957).

8 guineapigs, each weighing more than 400 g., were sensitised by the subcutaneous injection of 2·5 Lf in 1 ml. of physiological saline solution of laboratory standard A.P.T. Not less than twenty-eight days later their flanks were depilated to provide space for four reactions on each side, thus providing eight injection sites. Two doses of the "standard" F.T. (2·0 Lf and 0·5 Lf in 0·2 ml. of physiological saline solution) and two doses of the "unknown" were used. (The "standard" F.T., in the same dose, to which had been added 1000 million and 250 million pertussis cells.) 0·2 ml. of each dose was injected intradermally at two sites on each guineapig in such a way that, when all the animals had been injected, each dose had been injected twice at each of the corresponding sites.

Apart from these restrictions, the particular arrangement of the doses given at the sites on each animal was chosen at random. The diameters of the lesions were measured after 24 hours. The result of the test was calculated by standard statistical methods (Fisher 1947) on the basis that the diameters of the lesions are directly proportional to the logarithm of the concentration of toxoid.

Results

Sensitising Power of Diphtheria Prophylactics

Under the conditions of these experiments F.T. and T.A.F. did not significantly induce sensitivity to toxoid. This was true of several batches of F.T. obtained from different sources and varying in purity, but only a single batch of T.A.F. has been tested. A.P.T. and P.T.A.P., in the doses stated, induced maximal sensitivity. However, by decreasing the dose of both adsorbed antigens, P.T.A.P. was shown to be a significantly more potent sensitising agent than A.P.T., the difference being about sixfold.

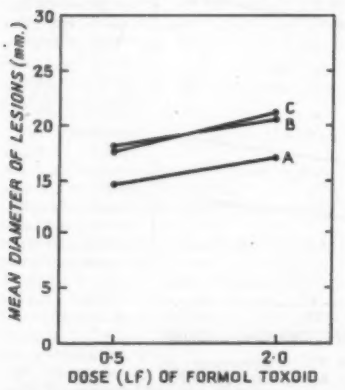

Fig. 1—Dose-responses of sensitised guineapigs to: A, F.T.; B, F.T. plus pertussis vaccine; C, pertussis vaccine alone.

The addition of pertussis vaccine to a sample of F.T., which did not in itself induce significant sensitivity, produced maximal sensitivity to toxoid (fig. 1). The addition of the same dose of the same batch of pertussis vaccine to a sample of A.P.T., which itself induced submaximal sensitivity, increased the degree of sensitivity induced to maximal. It would require large numbers of guineapigs to make the dose-response curves needed to compare the sensitising potencies of the various combinations of F.T., A.P.T., P.T.A.P., and pertussis vaccine; and we felt that the value of the data obtained would not at present justify so large an undertaking.

Effect of Diphtheria Prophylactics in Sensitised Guineapigs

By the method described F.T. mixed with pertussis vaccine was assayed against F.T. The large dose of pertussis vaccine was comparable with that used for immunising man. The mixture produced significantly larger areas of inflammation than that produced by F.T., but pertussis vaccine alone caused lesions of comparable size in both non-sensitised and sensitised guineapigs (fig. 2). The lesions can therefore be attributed to the non-allergic inflammatory action of the pertussis organisms. Apparently there was no synergism between the non-allergic inflammation due to the pertussis organisms and the allergic inflammation due to the toxoid. This conclusion was supported by an experiment in which the dose of pertussis vaccine was so diminished that the inflammatory effects of F.T. and of F.T. mixed with pertussis vaccine did not differ.

Discussion

There is a large difference between the sensitising power of F.T. and of T.A.F., on the one hand, and of the adsorbed antigens, A.P.T. and P.T.A.P., on the other hand. The addition of pertussis vaccine produces an effect like that of an adsorbing agent. The addition to diphtheria toxoid of pertussis vaccine, or precipitation of diphtheria toxoid with aluminium phosphate, increases sensitivity to a greater degree than does the precipitation of diphtheria toxoid by alum. The analogy between sensitising power in guineapigs and the reported (Medical Research Council 1956) power to increase the incidence of paralytic poliomyelitis in man is therefore close.

We have made no attempt to analyse the nature of hypersensitivity to diphtheria toxoid or to assess the relative proportions of immediate and delayed allergic responses after single or repeated antigenic stimuli; nor have we considered the relationship between allergic and immune responses to diphtheria prophylactics. Our purpose is to report the clearcut distinctions outlined in view of their potential practical significance if the analogy between sensitising power of diphtheria prophylactics and paralysis-inducing power should prove to be a general one.

To the experimental worker it is perhaps of interest that pertussis vaccine can induce anaphylactic shock in mice (Parfentjev et al. 1947) by rendering this species susceptible to histamine (Parfentjev and Goodline 1948, Maitland et al. 1955). Sensitivity to total body irradiation is also produced in mice by *Hæmophilus pertussis*, and apparently this effect is also due to the power of this vaccine to increase susceptibility to histamine (Rowen et al. 1955). Mice are predisposed both to infection by bacteria and by influenza virus by similar means (Parfentjev 1955). Maitland et al. (1955) have shown that *H. pertussis*, but not *H. parapertussis*, *H. bronchisepticus*, and *H. influenzæ*, contains an antigen, which they named the histamine-sensitising factor (H.S.F.), to which they attribute the increased sensitivity of mice and rats to anaphylaxis and to histamine; but they state that the guineapig is not susceptible to such effects. However, our experiments were concerned not so much with the immediate type of allergic reaction, which is intimately concerned with histamine metabolism, but more with a delayed (tuberculin-type) reaction, in which histamine metabolism probably has a minor role. The effects described by us possibly represent a different action of the H.S.F. in a different animal species.

Summary

A quantitative measure of hypersensitivity to diphtheria toxoid in guineapigs has been devised. It can be

used for studying both the immediate (Arthus-type) reaction and the delayed (tuberculin-type) reaction. The reactions described here represent total allergic damage after 24 hours.

A single injection of formol toxoid (F.T.) or of toxoid-antitoxin floccules (T.A.F.) does not induce significant sensitivity to intradermally injected F.T.

A single injection of the adsorbed antigens, alum-precipitated diphtheria toxoid (A.P.T.) and aluminium-phosphate-precipitated diphtheria toxoid (P.T.A.P.), induced striking hypersensitivity to intradermally injected F.T.

A single injection of F.T. to which pertussis vaccine had been added induced striking hypersensitivity to intradermally injected F.T.

The addition of pertussis vaccine to F.T., and the precipitation of toxoid with aluminium phosphate, increased hypersensitivity to F.T. to a significantly greater degree than did the precipitation of toxoid by alum.

There is a correlation between the sensitising power of diphtheria prophylactics in guineapigs and their reported ability to increase the incidence of paralysis in patients with poliomyelitis.

We are indebted to Miss M. V. Mussett, B.SC., for statistical analyses; Miss M. Barr, M.SC., for diphtheria prophylactics and the pertussis vaccine; and Dr. L. Holt for large quantities of dried formol toxoid both for the laboratory standard and for the test allergen.

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TREATMENT OF JUVENILE THYROTOXICOSIS WITH POTASSIUM PERCHLORATE*

J. M. SMELLIE
O.B.E., T.D., M.D. Edin., F.R.C.P.
PROFESSOR OF PÆDIATRICS, UNIVERSITY OF BIRMINGHAM

FOR hyperthyroidism (Graves' disease) in adults the relative advantages and disadvantages of medical and surgical treatment are fully appreciated (*Lancet* 1954). In general, subtotal thyroidectomy is the method of choice, and in competent hands its results are excellent and permanent. Medical treatment is therefore usually reserved for those patients who, for various reasons, are deemed unsuitable for surgery.

Since, however, hyperthyroidism in childhood is rare (McClintock et al. [1956] estimated that only 1·0–2·5% of all cases occur in this age-group) experience of its therapy is therefore limited, and the merits and demerits of various therapeutic procedures are controversial. Endocrine balance is very easily deranged during childhood, when all sorts of adaptations, adjustments, and readjustments are being made. To remove a portion of the thyroid gland at this age is somewhat speculative and hazardous, and the ultimate outcome cannot always be accurately assessed. To remove too much is catastrophic, and to remove too little will necessitate a further operation later. McClintock et al. (1956) record that of 45 children who underwent subtotal thyroidectomy, 13 afterwards showed hypothyroidism and 4 had clinical evidences of hypocalcæmia, presumably due to hypoparathyroidism. Of 22 children who had bilateral exophthalmos before operation, no improvement of the exophthalmos was demonstrable in 6. Kunstadter and Stein (1955) say that, even in the hands of skilful surgeons, the possibility of recurrences and postoperative effects on growth and endocrine function is real. They refer to 5 thyroidectomised children who developed postoperative endocrine disturbances—retarded growth, hypoparathyroidism, hypothyroidism, and polyglandular disturbances including retarded sexual development and obesity.

Treatment by external irradiation of the thyroid or radioactive iodine is now generally considered unsuitable for children, because of possible sequleæ (Hubble et al. 1957).

Thiouracil and its compounds are effective against thyrotoxicosis because they prevent the thyroid gland from synthesising thyroglobulin. But they are liable to produce dangerous toxic reactions—agranulocytosis, drug fever, rashes—which are a serious drawback to their administration on a long-term basis, for children in particular. Carbimazole is less likely to produce toxic reactions in adults, but its place in the control of hyperthyroidism in children is as yet unknown.

In 1952 Stanbury and Wyngaarden showed that potassium perchlorate can displace iodine from its position in the thyroid gland. As little as 3 mg. of this substance given by mouth produces a considerable fall in thyroid iodine, and after the oral administration of 100 mg. iodine uptake appeared to be inhibited for about six hours, by which time approximately half the dose had been excreted in the urine.

Godley and Stanbury (1954) reported on the treatment of 24 hyperthyroid patients with potassium perchlorate 200–400 mg. given by mouth every eight hours. This proved effective in controlling the disease. 2 of their patients had become euthyroid and treatment had been stopped; 13 had been submitted to subtotal thyroidectomy; and the remainder were still under treatment. No toxic effects were seen apart from slight irritation of the gastrointestinal tract.

Morgans and Trotter (1954) treated 108 patients with Graves' disease, giving potassium perchlorate for one to ten months, and found that the drug controlled the disease in most patients, though the rate of response appeared somewhat slower than with methylthiouracil. The only toxic effects observed were possible signs of gastric irritation in 2 cases.

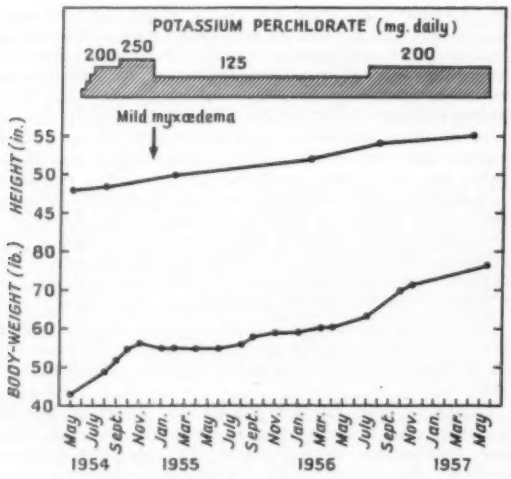
The ages of these patients are not given, but presumably they were all adults, and I have found no report of the use of potassium perchlorate in juvenile thyrotoxicosis.

A recent annotation on the treatment of hyperthyroidism in children (*Lancet* 1957) gives a succinct and balanced summary of present views and opinions, and at the same time lays due emphasis on the limitations in our knowledge.

Case 1.—A girl, aged 8 years, was admitted with typical features of hyperthyroidism—exophthalmos, enlarged thyroid, fine tremors, sweating, and tachycardia—of about five months' duration. Her mother, a maternal uncle, a great-aunt, and her grandfather had all had partial thyroidectomy for thyrotoxicosis.

The serum-cholesterol was 156 mg. per 100 ml. Radiographs of the skeleton showed normal ossification for her age, and the uptake of radioactive iodine indicated a highly active gland. Her response to treatment with potassium perchlorate during the past thirty-six months is shown in the figure. When she had had 250 mg. daily for three months her mother said that she had become dull, uninterested, and drowsy, and complained of feeling cold—symptoms suggestive of mild myx-

* Read at a provincial meeting of the Section of Pædiatrics, Royal Society of Medicine, June 15, 1957.



Case 1—Response to treatment.

œdema. The daily dose was reduced and her feeling of well-being and good health returned.

After sixteen months' treatment the goitre persisted, and she was given thyroid gr. $^1/_2$ daily in an attempt to reduce the size of the gland. No material benefit was demonstrable after eight months. She was then given stilbœstrol 5 mg. daily, but the emotional disturbance produced by the startling acceleration of secondary sexual characteristics necessitated its cessation after two weeks. After treatment for three years, she is very well and appears stabilised on 200 mg. of potassium perchlorate daily. Her exophthalmos and enlarged thyroid are, however, still very evident. Her radioactive-iodine uptake has not been remeasured, for reasons that do not require reiteration, and we have been content to assess her progress clinically. Radiologically, her bone age is still normal. Psychologically she is very well adjusted. The dosage of potassium perchlorate is being cautiously reduced.

Case 2.—A girl, aged $6^1/_2$, had had nervousness, sweating, and prominent eyes for about three months. She had an enlarged thyroid and moderate exophthalmos. Her bone age was normal. A month later she was discharged from hospital on a dose of 300 mg. of potassium perchlorate daily, having gained weight; the thryoid was diminishing in size and her sleeping pulse-rate was normal. After about seven months on this dose she, too, presented symptoms suggestive of slight hypothyroidism; but these disappeared when the dose was reduced to 200 mg. daily. Now she is stabilised, and after thirteen months' treatment her clinical state can be described as satisfactory in all respects.

Case 3.—A girl, aged 10, had twelve months' history of nervousness and sweating, good appetite, losing weight, and dislike of hot weather. Her eyes were prominent, and the thyroid gland moderately enlarged. Her serum-cholesterol was 126 mg. per 100 ml. and her bone age normal. She responded well to potassium perchlorate, and since discharge in November, 1956, progress has been satisfactory on a daily dose of 300 mg. There is some diminution in her goitre and exophthalmos, and for the past seven months her symptoms have been fully controlled.

Case 4.—A girl, aged $8^1/_2$, first came under treatment in June, 1952. She was treated with propylthiouracil and phenobarbitone for two years. She was responding well, but then developed almost complete agranulocytosis with only 3% polymorphonuclears in a total leucocyte-count of 3000. Treatment was then changed to potassium perchlorate 225 mg. daily for about nine months. At that time she was euthyroid, and for the past eighteen months she has remained well without therapy.

Case 5.—A girl, aged 11, had had symptoms of thyrotoxicosis for some six months and exophthalmos for two months. Her basal metabolic rate (B.M.R.) was plus 45%, the bone age normal, the serum-cholesterol 212 mg. per 100 ml., and the electrocardiogram within normal limits. On potassium perchlorate her B.M.R. was reduced to normal within two months. She remains well controlled on 150 mg. daily, and the exophthalmos and the thyroid enlargement have regressed after treatment for twenty-seven months.

Case 6.—Hyperthyroidism was diagnosed in this child just a year ago when she was 13. Her B.M.R. was plus 24%. She has been treated with potassium perchlorate 200 mg. daily with a pleasing response. Her B.M.R. soon dropped to normal, and she has gained $1^1/_2$ st. in weight. Her nutritional state is excellent and exophthalmos has practically disappeared. Though her thyroid is still prominent, she is clinically euthyroid.

Discussion

From this limited experience it seems that potassium perchlorate has a place in the treatment of juvenile thyrotoxicosis. Apart from hypothyroidism (which can readily be recognised) there has been no untoward side-reaction in a period of treatment as long as three years. Godley and Stanbury (1954) and Morgans and Trotter (1954) reported evidence of mild gastrointestinal irritation in a few of their cases, but no such symptoms have been observed in any of the children in this series. The disadvantages of long-continued medical treatment to adults with thyrotoxicosis do not apply to children, and their schooling and daily routine need not be modified in any way.

Morgans and Trotter (1954) found that the rate of response was somewhat slower with potassium perchlorate than with methylthiouracil, but in the cases reported here the response did not seem to be delayed. According to Crawford (1956) it takes about six weeks of propylthiouracil therapy to make a thyrotoxic child euthyroid, and in our cases potassium perchlorate needed about the same time.

Whether potassium perchlorate can restore all hyperthyroid children to health and thus render surgery unnecessary has yet to be ascertained. Experience to date suggests that treatment will be required for a period of up to two or three years, and perhaps through puberty. But even if this drug keeps the children euthyroid only until puberty, it will delay partial thyroidectomy and render any operation safer and sounder.

One very important point brought out by Morgans and Trotter (1954) must be emphasised. A patient whose thyrotoxicosis is controlled with perchlorate would be liable to relapse if his blood-iodide level was suddenly raised—e.g., taking an iodide-containing cough mixture. Iodine, therefore, should never be prescribed in combination with potassium perchlorate.

Lastly, it may not be inopportune to mention that the total cost of the drug for my first patient, who has been treated continuously for three years, has been less than one pound sterling!

Summary

In 6 girls, whose ages ranged from $6^1/_2$ to 13 years, symptoms and signs of thyrotoxicosis were soon controlled with potassium perchlorate. No side-effects were seen.

The drug is worthy of further trial in children.

Iodine must not be given during perchlorate treatment.

Thanks are due to Dr. Frances Braid, Dr. C. G. Parsons, and Dr. W. A. Cant for permission to describe cases who have been under their care.

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VALIDITY OF THE UREA METHOD FOR ESTIMATING TOTAL BODY-WATER IN MALNUTRITION

S. G. SRIKANTIA C. GOPALAN
M.B. Mysore, B.Sc., M.D. Madras, Ph.D. Lond.

From the Nutrition Research Laboratories, Indian Council of Medical Research, Coonoor, South India

OF the substances used for the estimation of total body-water, urea has the advantages of being non-toxic, and easy to administer and estimate. Criticisms have been levelled against the two assumptions inherent in the method—that the rate of endogenous urea formation is constant throughout the experimental period, and that the diuresis induced by the ingestion of large amounts of urea does not significantly affect the results. Antipyrin and deuterium have been suggested as being more suitable. Kornberg and Davies (1952), however, using small amounts of radioactive urea, obtained values for total body-water which agreed closely with those obtained by other methods, including the use of non-isotopic urea. Studies in man, using labelled urea, have yielded results closely approximating to those obtained by the use of deuterium (San Pietro and Rittenberg 1953). These studies indicate that the urea method is reliable, at least in normal subjects.

Gopalan et al. (1953) and Holmes et al. (1954) have used the urea method for the estimation of total body-water in severely malnourished and œdematous patients, and obtained values for total body-water as high as 87–90% of the body-weight. Commenting on these high values, Widdowson (1956) has suggested that urea nitrogen might be utilised by protein-depleted tissues, and that this might result in overestimation of total body-water in malnutrition when the urea method is used. If this suggestion is correct, apart from the fundamental implications involved, it follows that the urea method is unsuitable for the estimation of body-water in severe malnutrition.

As Widdowson pointed out, the methods by which the above suggestion could be put to test would be :

(*a*) To compare the values obtained for total body-water in protein-deficient persons by the urea method with those obtained by the use of some other substance such as antipyrin.

(*b*) To give urea to patients with protein malnutrition, subsisting on low-protein diets, and to follow the retention of nitrogen in these subjects by means of balance experiments.

Both these methods are being applied here for the elucidation of this question. Here we present the results of simultaneous determination of total body-water by the urea method and the antipyrin method in normal people and severely malnourished and œdematous patients.

Material and Methods

The subjects of this investigation were five apparently normal adults and five adult patients with severe malnutrition associated with protein-deficiency œdema. The patients were similar to the patients with nutritional œdema investigated earlier by Gopalan et al. (1952), though generally less severely undernourished.

The total body-water of all subjects was estimated by the simultaneous use of urea and antipyrin. 20 g. of urea was given orally, and 1 g. of antipyrin in 50 ml. of 5% glucose solution intravenously over a period of five minutes. Samples of blood were obtained 2, $3^1/_2$, and 5 hours after the injection in the normal subjects and 5, 7, and 8 hours after the injection in the œdematous patients. The urine voided during each interval was collected under toluene. Urea, in the serum and urine, was determined by the method of van Slyke and Cullen (1914). Antipyrin was estimated as the 4-nitroso-antipyrin using a spectrophotometer at 350 mμ (Brodie 1951). Total plasma-proteins were estimated (by the microkjeldahl technique) in order to apply the necessary corrections to the water space.

Results

Expressed as percentage of body-weight, the total body-water, estimated by use of urea, ranged from 52·6 to 61·4 (mean 58·4) in the normal people, and from 65·1 to 89·3 (mean 75·8) in the œdematous patients (see table). Values, by the antipyrin method, ranged from 48·8 to 65·2 (mean 57·9) in the normals and from 64·5 to 86·3 (mean 75·8) in the œdematous patients. The urea values were slightly higher in three of the five normals and four of the five œdematous patients. The mean value for the urea/antipyrin ratio was, however, practically identical in the two groups—1·013 in the normals and 1·014 in the malnourished subjects. No correlation was observed between the percentage of body-water and the urea/antipyrin ratio.

SIMULTANEOUS ESTIMATION OF TOTAL BODY-WATER BY UREA AND ANTIPYRIN METHODS IN FIVE NORMAL ADULTS AND FIVE MALNOURISHED PATIENTS WITH ŒDEMA

Case		Total body-water (as % of body-weight)		Urea/antipyrin ratio × 100	
		Urea method	Antipyrin method		
Normal adults	1	61·1	58·7	104·0	101·3
	2	61·4	59·6	103·0	
	3	61·4	65·2	94·4	
	4	52·6	48·8	108·0	
	5	55·3	57·0	97·1	
Malnourished patients	1	77·8	81·6	95·3	101·4
	2	65·1	64·5	100·9	
	3	75·3	73·2	102·9	
	4	76·8	73·5	104·4	
	5	89·3	86·3	96·7	

Discussion

The results indicate that urea tends to give values slightly higher than does antipyrin in both normal and malnourished subjects. But the differences between values in the urea and antipyrin methods are no higher in the malnourished patients than in the normal controls. This would indicate that under conditions obtaining in the estimation, urea is not being used to any significant extent for purposes of nitrogen metabolism in the malnourished subjects. These results need not necessarily be considered inconsistent with the reported observations pointing to the possible use of urea by protein-deficient tissues (Holt and Snyderman 1956). It is possible that urea cannot be used by the tissues when administered alone as it was here, but can be used when given with a low-protein diet in malnourished patients. This question is being further explored and the results of the study will be published in detail later.

It may, however, be concluded from the present study that the urea method in malnourished subjects does not lead to any significant overestimation of total body-water. The results, therefore, seem to put the urea method on a firmer footing as a simple and reliable method for the determination of total body-water, not only in normal subjects, but also in severely malnourished and œdematous patients.

Summary

Total body-water was estimated in five normal adults and five malnourished œdematous patients. The differences in the results obtained by the urea and antipyrin methods were small and no more in the patients than in the normal people. These results indicate that the urea method is suitable for the estimation of total body-water even in malnourished patients.

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ACUTE MERCURY POISONING IN INFANCY

REPORT OF A CASE

I. D. P. WOOTTON
M.A., M.B., Ph.D. Lond., F.R.I.C.
LECTURER IN CHEMICAL PATHOLOGY

A. G. GIDDINS
M.B. Lond., D.C.H.
HOUSE-PHYSICIAN

POSTGRADUATE MEDICAL SCHOOL OF LONDON

ALTHOUGH chronic mercurial poisoning in infancy was a well-recognised entity when teething-powders contained calomel (Wilson et al. 1952, Farquhar 1953), acute poisoning is less common. A child of 4 months died of pneumonitis, gastro-enteritis, and renal failure 3 days after inhaling mercury vapour (Campbell 1948); a baby of 6 months died 4 days after an accidental injection of mersalyl (*British Medical Journal* 1955); and Kaplan and Forman (1953) reported the recovery of a boy of 4½ years in whom acute anuria developed after he had swallowed tablets of mercuric chloride and was treated by the conservative régime of Bull et al. (1949). In the case recorded here, a baby was accidentally poisoned with mersalyl and recovered after treatment on similar lines, in spite of oliguria lasting for 10 days.

Case-report

Two brothers, one aged 2 years and one aged 3 months, were examined at home by their family doctor. He diagnosed bronchitis and ordered penicillin by injection, administering the first dose at once from his own stock. A supply of penicillin and ampoules of distilled water was ordered from a chemist, and on the following morning the district nurse injected into each child a solution made from the material supplied. Soon afterwards, the chemist discovered that 10% mersalyl solution had been supplied in ampoules instead of distilled water. Each child had received 2 ml. of the mercurial preparation, containing about 75 mg. of mercury. Both were immediately admitted to hospital. They appeared normal, apart from mild bronchitis. Treatment with dimercaprol was started within 4 hours of the accident, at a dosage of 3 mg. per kg. body-weight. For the first 2 days this dose was injected 4-hourly, during the 3rd day 6-hourly, and subsequently 12-hourly to a total of 10 days.

The elder child showed no signs of mercury poisoning and was discharged after an uneventful stay in hospital. The younger, who weighed 12 lb. (5·4 kg.), appeared normal for the first day in hospital, though he was said to have passed two loose motions at home, in contrast to his usually constipated habit. Breast-feeding was continued. Blood was taken for urea and electrolyte determinations (see table) and a tube was attached to the penis to permit complete urine collection. 24 hours after admission, urine-flow almost completely failed (fig. 1), the small quantity passed being loaded with albumin. Breast-feeding was immediately stopped, and intragastric tube-feeding began with 'Prosparol' oil emulsion diluted with 40% glucose solution. Intake of water was calculated as 200 ml. (to compensate for insensible loss) plus the volume of urine.

PLASMA ELECTROLYTE AND UREA LEVELS

Plasma electrolytes (mEq. per litre) and urea (mg. per 100 ml.)	Day of illness							
	1	3	4	7	9	13	14	15
Sodium	130	..	135	143	135	..	133	145
Potassium	4·0	..	5·4	4·6	4·5	..	5·3	4·9
Chloride	109	..	..	..	..	..	..	..
Bicarbonate	..	..	9·5	8·6	12·8	..	..	..
Urea	12	70	90	112	134	35	..	..

Progress

The oil and glucose was not very well tolerated, and caused some vomiting. The intake of water proved inadequate. Possibly because of the over-ventilation of acidosis (the plasma bicarbonate had fallen to 9·5 mEq. per litre), combined with the vomiting, the baby became dehydrated on the 4th day. An intravenous polythene tube was inserted on the 7th day, and increased quantities of fluid were administered (vide infra the need for larger replacement than the calculated insensible loss was one of the lessons learned from this case). Intravenous fluid was continued for 8 days. During this time the baby was perhaps a little drowsy, but was bright and cheerful when roused. He continued to vomit until the 16th day after admission. The blood-urea rose steadily to 134 mg. per 100 ml. Plasma-electrolyte determinations were done when necessary by micromethods, using heel-prick blood to conserve veins. The baby was weighed each day and accurate balance data of water and electrolytes were kept (fig. 2). The potassium lost was replaced, as soon as diuresis appeared to be established, on the 11th day, to forestall as much as possible the risk of an uncontrollable potassium-losing state.

On the 14th day the child became rapidly worse, with diminished skin tension and sunken fontanelles. He had lost about 500 g. in weight during the previous day, serum-sodium had fallen, and sodium was almost absent from the urine. The unexpected sodium deficiency was treated with 54 mEq. of sodium chloride in solution intravenously during 2 days. The infusion produced striking clinical improvement, and

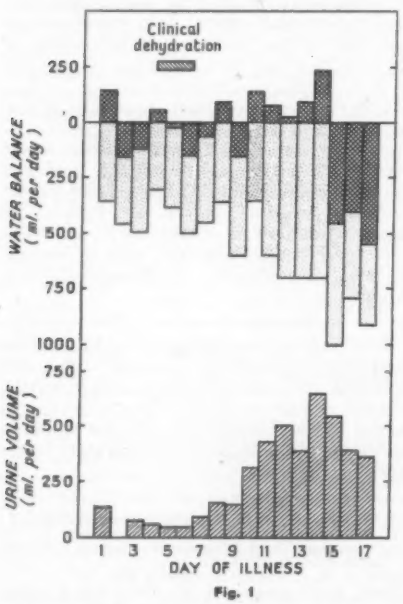

Fig. 1

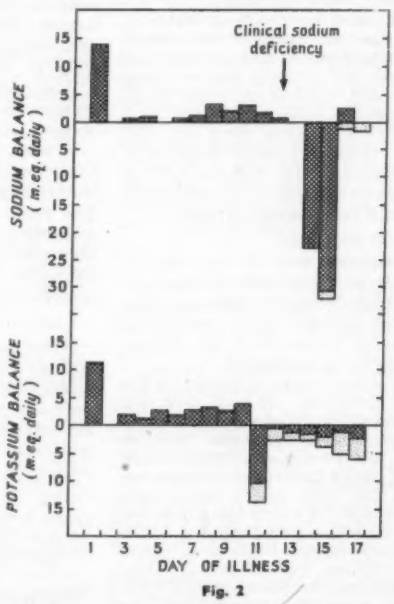

Fig. 2

Fig. 1—Daily urine-output and water-balance. Intake is plotted from the base-line downwards and output is plotted upwards from the bottom of the intake column. The daily balance (hatched area) points downwards in positive balance and upwards in negative balance.

Fig. 2—Daily sodium and potassium balances.

breast-feeding, which later had to be supplemented, was re-established. The baby was discharged apparently well, with no residual albuminuria.

Discussion

Although treatment was necessarily empirical and related each day to the patient's condition and the balance data, it is possible in retrospect to calculate that this patient's "insensible loss" amounted, per day, to 300 ml. of water and 4 m.Eq. of sodium (cf. Pratt et al. 1949). (In addition to lung and skin losses, these estimates include bowel excretion.) Although losses of this order are quite insignificant in adult practice, their importance in this case was considerable, since a child of this weight is a chemical entity about a tenth the size of an adult.

The dose of mercury administered to this child was 15 mg. per kg. body-weight, and it is known that this amount, in rabbits, causes death from renal failure. But careful control of the water and electrolyte balance maintained the patient in good condition until a diuresis occurred on the 10th day of illness. The evolution of the oliguric state appeared to be exactly similar to that observed in adults.

The mercury content of the urine was estimated. A total of 12·1 mg. was found during the first three days, and only negligible amounts subsequently. It is assumed that the remainder of the metal was excreted into the bowel.

Summary

A boy aged 3 months recovered from accidental mercury poisoning after administration of dimercaprol and conservative treatment of oliguria. The daily insensible losses were more than had been expected, and extra sodium and water had to be given.

We wish to thank Dr. C. Newman for permission to publish this case. The successful result was largely due to the skill of the pædiatric nursing staff and the analysts of the chemical pathology department.

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PERICARDECTOMY FOR CHRONIC CONSTRICTIVE PERICARDITIS

J. R. MARSHALL, M.B. Belf.
SENIOR HOUSE-OFFICER
J. F. PANTRIDGE, M.C., M.D. Belf., M.R.C.P.
PHYSICIAN
ROYAL VICTORIA HOSPITAL, BELFAST

OF 18 patients with chronic constrictive pericarditis seen by one of us in the past seven years 17 underwent pericardectomy. The earlier patients had only their ventricles decorticated because it is commonly held that it is unnecessary to decorticate the auricles and the great veins.

However, the slow and, in many cases, incomplete return to normal of patients who underwent limited pericardectomy, and, in particular, the experience of the following case led us to doubt the efficacy of decortication confined to the ventricles.

A boy, aged 9 years, was first seen in October, 1950. He showed the clinical picture characteristic of constrictive pericarditis: effort intolerance, engorged jugular veins, hepatic enlargement, ascites, a third heart sound, and absence of cardiac enlargement. The right auricular pressure was 36 cm. of saline solution above the sternal angle.

VENOUS PRESSURE * AT STAGES IN DECORTICATION

Case no.	1	2	3	4	5
Heart exposed ..	18·0	12·0	22·0	18·5	16·5
Ventricles cleared	18·0	12·0	21·0	17·5	11·5
Auricles cleared ..	12·5	10·0	8·0	14·5	7·0
Venæ cavæ cleared	11·0	6·0	8·0	12·5	0·0

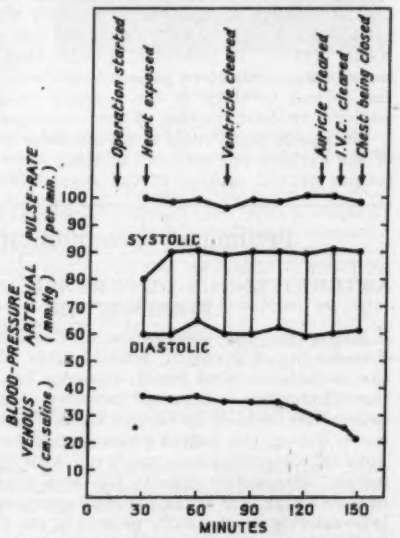
* In cm. saline solution above sternal angle.

Pericardectomy was done on Nov. 2, 1950, both ventricles being completely decorticated. No significant clinical improvement followed this operation: the central venous pressure remained high (26 cm. saline solution), and hepatic enlargement persisted.

At a second operation, in November, 1956, Mr. T. B. Smiley noted that the ventricles were entirely clear. A dense mass of fibrous tissue was removed from the right auricle and venæ cavæ, and the venous pressure immediately fell.

In the light of this experience it was decided to place the tip of a cardiac catheter in the inferior vena cava before operation and to record the pressure with a saline manometer during pericardial resection.

The accompanying table shows the results in 5 patients. In some cases an interval of 15 minutes was allowed to elapse after clearing the ventricles and before decortication of the auricles was started. In 4 of the 5 cases the venous pressure did not fall significantly after ventricular clearing, but it fell abruptly when the auricles were cleared and usually further when the great veins were decorticated.



Case 4: fall in venous pressure independent of changes in heart-rate and blood-pressure.

The accompanying figure shows that the fall in venous pressure was independent of changes in the heart-rate and arterial blood-pressure.

Discussion

Opinions differ about the extent of decortication necessary for the correction of the hæmodynamic disturbances produced by chronic constrictive pericarditis. Harrington (1944) believed that it was advisable to separate as much of the pericardial sac as possible from the ventricles, the right auricle, and the orifice of the inferior vena cava. Bigelow et al. (1956) remove the pericardium over the ventricles and dissect both venæ cavæ free.

However, most reports indicate that decortication of the ventricles is all that need be done. Thus Heuer and Stewart (1939) state that they "have removed as completely as possible the pericardium over the left and right ventricles but have not attempted to remove the adherent pericardium over the auricles", and Blalock and Burwell (1941) concluded that "if the ventricles are properly freed of scar the undecorticated auricles are able to

conduct sufficient blood to the ventricles to supply the needs of the body."

After studying the circulatory dynamics in patients with pericardial constriction Sawyer et al. (1952) reported no pressure changes pointing to physiologically significant obstruction in the great veins or auricles. These workers concluded that "the objective of surgery is the adequate release of both ventricles; no indications have been found for the decortication of the great veins or auricles."

The proportion of successful results from this limited pericardectomy varies from 35% (Mortensen and Warburg 1948) to 65% (Evans and Jackson 1951). Many causes have been given for the high incidence of failure; these include myocardial fibrosis, myocardial atrophy, incomplete relief of the ventricles, adhesive pleuritis, and congestive cirrhosis of the liver.

The data presented here indicate that inadequate release of the auricles may explain many of the failures. Possibly the release of the auricles is necessary for normal mobility of the auriculo-ventricular ring. The importance of free motion of the auriculo-ventricular ring in the action of the right side of the heart was emphasised by Keith (1918). It therefore appears that the object of surgery in constrictive pericarditis should be to restore the normal mobility of the auriculo-ventricular ring in addition to decortication of the ventricles.

Perhaps in many cases complete decortication not only of the auricles but also of the venæ cavæ is required to restore normal motion of the auriculo-ventricular ring.

Unfortunately resection of the thickened pericardium from the auricle and venæ cavæ is not without risk. Blalock and Burwell (1941) state "most authors are agreed that actual decortication of the auricles is a hazardous procedure and should not be attempted".

The desire to restore normal circulatory dynamics must therefore be weighed against the risk of decortication of the thin-walled right auricle and venæ cavæ. However, in the 6 cases reported here no technical difficulty was encountered in completely clearing the auricles and venæ cavæ.

Summary

Evidence is presented which suggests that decortication limited to the ventricles may not be adequate for the complete relief of the hæmodynamic disturbances produced by chronic constrictive pericarditis.

We are indebted to Mr. T. B. Smiley and Mr. J. A. W. Bingham for their cooperation.

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Preliminary Communication

ARTERIOVENOUS DIFFERENCE IN NATURAL FIBRINOLYSIS

FOLLOWING the observation of Fearnley, Revill, and Tweed [1] that fibrinolytic activity after adrenaline injection is labile in shed blood, evidence has been obtained that fibrinolysis is a normal property of blood, enhanced rather than induced by various kinds of stress.[2–6] Furthermore, during the past 4 years, in the course of several hundred determinations made on healthy and diseased people,[6] fibrinolytic activity has been found absent only once—in a patient dying of carcinomatosis. That fibrinolytic activity is constantly present in the blood, according to the above observations, is emphasised because fibrinolysis is still commonly regarded as an induced rather than a naturally occurring phenomenon. The labile agent responsible has been termed by Fearnley and Lackner [4] "labile fibrinolytic component" (L.F.C.), and postulated as a built-in antithrombotic and fibrin-clearing mechanism.

All the above studies were made on venous blood. Since our working hypothesis of the function of natural fibrinolysis has a wider application to arterial than to venous disorders, it occurred to us that equal fibrinolytic activity in arterial and venous blood should not be assumed. The only comparison between venous and arterial blood that we know of was made by Kwaan et al.,[7] who used the quantitative method of Biggs and Macfarlane [8] and found no significant difference of fibrinolytic activity in three patients with the syndrome of cryptogenic splenomegaly.

MATERIAL AND METHODS

The blood-clot lysis-time method [5] was used with 2·0 ml. volumes of a 1 : 10 dilution of blood in phosphate buffer, pH 7·4, clotted with 10 units of Parke Davis thrombin and incubated at 37°C.

The subjects were six patients with unequivocal evidence of one of the complications of atheroma, and six volunteers without any such complications.

Procedure.—The test was made on each subject at the same time of day, between 4 P.M. and 5 P.M., because of the diurnal variation of fibrinolytic activity.[5] Blood was obtained from the antecubital vein of one arm and the brachial artery of the other, the order of venous and arterial puncture being alternated from person to person in case the initial puncture resulted in an increase of fibrinolytic activity becoming manifest in the blood obtained at the second puncture.

RESULTS

The longer the lysis-time, the less was the fibrinolytic activity. In ten of the twelve people tested, arterial fibrinolytic activity was found to be less than venous, the difference varying with the individual (see table). In the atherosclerotic patient (case 7) whose arterial-blood lysis-time was three times that of his venous-blood

LYSIS TIMES OF VENOUS AND ARTERIAL BLOOD

Case	Age	Sex	Diagnosis	Lysis-times (hours)	
				Venous	Arterial
Subjects without atherosclerosis					
1	51	M	Peptic ulcer	4	6
2	43	M	Ankylosing spondylitis	3¾	5½
3	24	F	Healthy	3¾	6¾
4	29	F	Healthy	6½	8½
5	30	M	Healthy	2½	2½
6	70	M	Rheumatoid arthritis	3	6½
			Mean	3·9	6·0
Atherosclerotic subjects					
7	58	M	Cerebral atheroma	10	30
8	60	M	Gangrene of toes	1½	2½
9	45	M	Angina pectoris	3¾	4¾
10	56	M	Intermittent claudication	8½	10
11	83	F	Cerebral atheroma	1½	1¾
12	44	M	Myocardial infarct	1¾	4½
			Mean	4·5	8·9

1. Fearnley, G. R., Revill, R., Tweed, J. M. *Clin. Sci.* 1952, **11**, 309.
2. Fearnley, G. R., Tweed, J. M. *ibid.* 1953, **12**, 81.
3. Fearnley, G. R. *Nature, Lond.* 1953, **172**, 544.
4. Fearnley, G. R., Lackner, R. *Brit. J. Hæmatol.* 1955, **1**, 189.
5. Fearnley, G. R., Balmforth, G., Fearnley, E. *Clin. Sci.* 1957, (in the press).
6. Fearnley, G. R. Unpublished data.
7. Kwaan, H. C., McFadzean, A. J. S., Cook, J. *Scot. med. J.* 1957, **2**, 137.
8. Biggs, R., Macfarlane, R. G. Human Blood Coagulation and its Disorders. Oxford, 1953.

lysis-time, a fatal cerebral arterial thrombosis developed 24 hours after the test.

In two people (cases 5 and 11), the lysis-time of venous and arterial blood were the same (the small difference in case 11 is within the error of the method).

These results not only indicate that venous-blood lysis-time is no measure of the fibrinolytic activity of arterial blood, but also suggest that the source of the labile agent responsible for natural fibrinolysis is in the periphery—either the tissues or the veins themselves. This would accord with the results of the experiments of Kwaan et al.,[9 10] who obtained evidence of a venous origin. The lower activity of arterial blood may be due to reduction of the labile agent during the passage of blood through the heart and lungs, or to dilution of blood from the periphery by visceral venous blood with perhaps a lower content of L.F.C. Finally, excretion of L.F.C. in the urine may contribute to the arteriovenous difference, though the magnitude of the latter renders this unlikely as the sole cause. These possibilities are being investigated.

G. R. FEARNLEY
M.D. Lond., M.R.C.P.
J. FERGUSON
M.B. Melb.
Gloucestershire Royal Hospital, Gloucester.

9. Kwaan, H. C., McFadzean, A. J. S. *Clin. Sci.* 1956, **15**, 245.
10. Kwaan, H. C., Lo, R., McFadzean, A. J. S., *ibid.* 1957, **16**, 241.

New Inventions

AN INSTRUMENT FOR SHAPING FIBULAR BONE PEGS

WHEN a bone-graft is to be inserted as a peg through a drilled channel, it is important that it be cut accurately to size, because if it is too large it will become impacted in the drill hole and probably break; and if it fits too loosely union with the host bone may be delayed. It is well known that to shape the fibula to accurate dimensions by hand is difficult and tedious because the bone is brittle and easily splintered. The instrument described here has been designed to overcome this difficulty by shaping a fibular bone-graft into a smooth peg with mechanical precision.

The assembled instrument consists of a reaming chamber which holds a set of four graduated circular end-cutters, a barrel, and a spindle-cap that fits into the chuck of an electric motor (fig. 1). Six cutters are supplied, ranging in diameter from $^{9}/_{8}$ in. to $^{11}/_{16}$ in., and there is a choice of three barrel sizes. A special introducer (fig. 2) is provided for fitting the cutters into the chamber. By selecting the appropriate four cutters and the correct size of barrel, grafts may be machined accurately to a diameter of $^{9}/_{8}$ in., $^{7}/_{16}$ in., or $^{1}/_{2}$ in.

The boiled instrument is fitted to the chuck of a suitable motor, which need not be sterilised. The motor is clamped or held rigidly on a table. The fibula is grasped firmly by two lion forceps and fed lightly into the mouth of the rotating reamer. A graft four or five inches long is thus easily shaped in a few seconds. If the cutters become clogged with bone fragments, it is a simple matter to loosen the chamber and clear the cutting teeth.

The optimal running speed is 1000 r.p.m.

The instrument is suitable for any operation in which a bone peg of large diameter is required. So far it has been used chiefly in ischio-femoral arthrodesis (fig. 3) by Howard's "V" technique,[1] in which the saving of time, compared with hand-shaping the fibula, may be as much as 15–20 minutes.

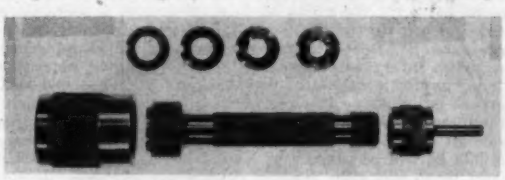


Fig. 1—Instrument unassembled, with four cutters.

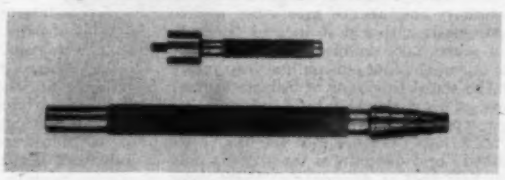


Fig. 2—Introducer.

Fig. 3—Fibular bone-graft in ischiofemoral arthrodesis.

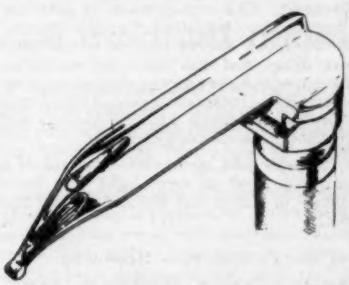
I should like to record my thanks to Mr. John Crawford Adams, consultant orthopædic surgeon to St. Mary's Hospital, London, and Mr. Austin Brown, consultant orthopædic surgeon to the Brighton and Lewes Group of Hospitals, for their encouragement and use of this instrument to prove its efficiency.

The instrument is made by Messrs. Willen Bros, 44, New Cavendish Street, London, W.1.

STANLEY HACKING
M.B. Lond., D.OBST.
Hove, Sussex

LARYNGOSCOPE FOR RESUSCITATION OF THE NEWBORN

IN resuscitation of the newborn, laryngoscopy and pharyngeal toilet under direct vision, tracheobronchial toilet, and tracheal intubation are all valuable. Anæsthetists are not always available for these tasks, and it is useful if those in attendance in the delivery-room can perform them.



This instrument has been designed for those who do not often use a laryngoscope. It has been tried over a period of 8 years and found easier to handle than other instruments in common use. It can also be used in anæsthetic practice for intubation of children up to about 5 years of age.

The blade is 10·5 cm. long (see figure). The bulb is of the size used in adult laryngoscopes, as this gives better light than a small bulb, does not obscure the view, and is easily replaced. The small handle is more convenient but this blade will fit a large handle, too.

It is made by the Longworth Scientific Instrument Co. Ltd., of Abingdon, Berks. The prototype was made by the technicians of the Nuffield Department of Anæsthetics at Oxford, and I should like to record my appreciation of their patience and skill.

E. H. SEWARD
M.A., D.M. OXON, F.F.A. R.C.S.

1. Howard, R. C. See *J. Bone Jt Surg.* 1950, **32B**, 282.

Reviews of Books

A Textbook of Fractures and Related Injuries

J. GRANT BONNIN, F.R.C.S. London: Heinemann Medical Books. 1957. Pp. 710. 84*s*.

ALREADY well known for his treatise on ankle injuries and his book, *A Complete Outline of Fractures*, Mr. Bonnin now adds a volume which, though it bears a superficial resemblance to his work on fractures, contains so much new material that it is, in fact as well as in title, new. To point the lesson that the fracture surgeon must be versed in more than orthopædic techniques, a first-rate chapter on head injuries has been contributed by Mr. T. G. I. James, and another on maxillo-facial problems by Mr. J. N. Barron.

The book is generously illustrated and the radiographs, so often disappointing in medical books of moderate price, have stood reproduction well. Much theoretical and practical detail has been compressed into its pages: for instance, there are sections describing the crush syndrome, the history of the treatment of compound fractures, the antibiotics, and the surgical exposure of the long bones. This very abundance may make the book less acceptable to the postgraduate student in general surgery than some others on the same subject. But the surgeon charged with the care of fractures and the trainee orthopædic consultant will find it invaluable. Mr. Bonnin disclaims any pretence to be encyclopædic; but many readers may feel he has been too modest.

Gout

JOHN H. TALBOTT, M.D., D.SC., professor of medicine, University of Buffalo School of Medicine, Buffalo, New York. New York and London: Grune & Stratton. 1957. Pp. 205. $6.75.

STUDENTS of gout characteristically develop an affectionate approach to the disease; they dwell lovingly on its history and distinguished victims, and delight in the anecdotes which it has gathered about itself. Dr. Talbott is no exception, and, after a flurry of excellent colour-plates, embarks on a brief but scholarly historical chapter.

A section on genetic aspects is followed by a review of current knowledge of the intermediary metabolism of uric acid, with particular reference to the fruitful contribution of recent work with labelled glycine. The succeeding clinical chapters are clearly based on wide personal experience and study, and the pitfalls of diagnosis, not always fully appreciated by clinicians, are fully discussed. The management of gout has lately been modified by the demonstration that the concentration of uric acid in the blood can be kept at a low level indefinitely by uricosuric drugs, and that this is not merely an academic biochemical exercise but a rewarding clinical achievement. Dr. Talbott's treatment of established gout is based on a continuous regime of probenecid, given with colchicine; and his views on dietetic restrictions are sensibly liberal.

The book gives a readable and up-to-date account of a subject on which a good deal of new light has been thrown, and in the study of which the Buffalo School has long been prominent.

The Management of the Patient with Headache

PERRY S. MACNEAL, M.D., F.A.C.P., physician to Pennsylvania Hospital and Benjamin Franklin Clinic, Philadelphia; BERNARD J. ALPERS, M.D., SC.D., F.A.C.P., professor and head of department of neurology, Jefferson Medical College, Philadelphia. London: Henry Kimpton. 1957. Pp. 145. 26*s*.

DOCTORS who see many patients with headaches will soon realise that a systematic approach is essential. The common and uncommon organic causes must be eliminated by a careful history and examination and by certain specific tests which involve some of the "final common paths" in the mechanism of headache, such as the afferent nerves to the structures concerned and the blood-vessels. When this has been done a number of patients—the more thorough the investigations the smaller the number—will be found in whom the usual mechanisms for headache do not seem to be involved; and they present a problem in primary psychogenesis.

Many others will also be affected by important psychogenic factors, but these will have been shown to act through recognisable and accessible physiological pathways—nervous, vascular, muscular, &c. A demonstration of these mechanisms will be of the greatest therapeutic importance both for psychotherapy and for temporary ad-hoc physical treatment. Such a systematic approach is lacking in this little book. Nevertheless it contains much useful information about the practical matters of diagnosis and treatment of headaches. A doctor experienced in this work who has evolved his own routine of investigation will find the book interesting and useful. To the tyro, however, it may bring confusion.

A Hundred Years of Evolution

G. S. CARTER, PH.D., Corpus Christi College, Cambridge. London: Sidgwick & Jackson. 1957. Pp. 206. 21*s*.

A RECENT poll of students in the United States is said to have shown that as many as 40% were uncertain whether man had evolved from lower organisms. It seems that the end of our pretensions to uniqueness is still harder to accept than the end of the geocentric universe. Dr. Carter's subject is the establishment of Darwinism as a permanent feature in the landscape of scientific thought. It is a scholarly account, both of Darwin's ideas and of his origins, in a style which has been rather heavily influenced by the Victorian originals upon which it comments. In describing the battle of evolutionists against orthodoxy it is a little muted by its author's obviously eirenic intention; it *was* a battle, and an exceptionally spirited one, which invites a rather more vivacious presentation. The most interesting sections of the book are those which discuss the present status of evolutionary biology and some of the questions raised by population genetics.

Operative Surgery

Vol. 4. Editor: CHARLES ROB, M.CHIR., F.R.C.S., professor of surgery at St. Mary's Hospital, London; RODNEY SMITH, M.S., F.R.C.S., surgeon to St. George's Hospital, London. London: Butterworth. 1957. Pp. 365. £5 10*s*. *Index*, £2.

THE fourth volume adds three further sections: the surgery of the head and neck, and axillary and inguinal lymph-node dissection; vascular surgery; and surgery of the endocrine glands. It is good to find in each part a comprehensive survey of the techniques involved, and they are up to date—which is a particularly fine achievement with the rapidly developing methods of vascular surgery. While the illustrations serve their purpose, those of the human figure and face continue to offend æsthetically—a weakness in a work so reliant on its illustrations.

The Practice of Industrial Medicine (2nd ed. London: J. & A. Churchill. 1957. Pp. 282. 30*s*.)—In its new edition, Prof. T. A. Lloyd Davies' book has been brought up to date and slightly enlarged. Dr. J. M. Rogan has contributed a good chapter on the hazards of coalmining. The book has a special value for the works medical officer and is particularly useful for any doctor who is taking a post in industry for the first time. After introductory chapters on occupational mortality, injury, and disease, and their historical aspects, a whole chapter is devoted to medical examinations and their purpose in industry. In a new preface, the place of the doctor in industry is discussed with characteristic frankness. So long as he is "paid by the employer, dismissable at whim for doing his job, he will be suspect by employees." The best solution might be to adopt the Belgian system of making the doctors and nurses in industry responsible to an employer-employee committee. Professor Lloyd-Davies thinks that "it is of secondary importance into what ministerial orbit industrial medicine is gathered so long as the industrial medical officer and nurse have definite and firm support." The sociological flavour of the first edition has been preserved, and the chapter on the social functions of industry is recommended to all who have at heart the welfare of industrial workers, particularly of young people. The section on industrial disease and toxicology is remarkably concise, but few important practical points are missed; and candidates for the diploma of industrial health will find that it adequately covers most of the curriculum.

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See Lancet, July 22, 1899, p. 219

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See Lancet, May 7, 1932, p. 992

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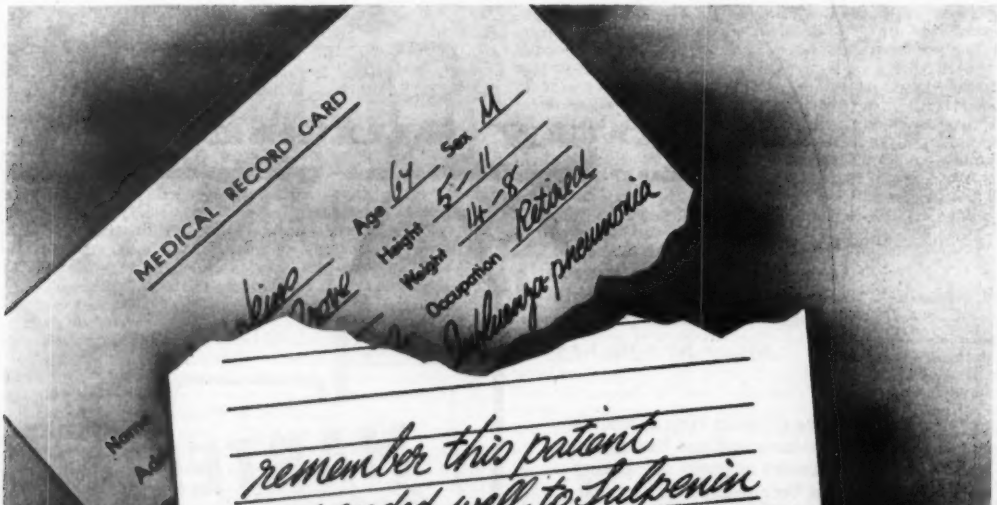
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THE LANCET
LONDON: SATURDAY, NOVEMBER 23, 1957

Too Many Doctors?

"To estimate, on a long term basis and with due regard to all relevant considerations, the number of medical practitioners likely to be engaged in all branches of the profession in the future and the consequential intake of medical students required."

WHEN they accepted this task, set them by the Health Ministers, Sir HENRY WILLINK and his committee were told by some authorities that it was impossible, and in any case ought not to be undertaken. But we are glad that they persisted; for, even if they prove to be wrong in some of their many assumptions and guesses, their report [1] is an informative and shrewd analysis of what is obviously a most complex situation. Their conclusions are plain enough to be an ideal starting-point for discussion both inside and outside the profession. They say that up to the present time the medical schools in Great Britain have *not* been producing too many doctors. They think that, with expansion of medical services, we can expect by 1971 an increase of 13% in the total number of doctors required compared with 1955—the greater part of this increase occurring before 1965. But they believe that continuation of the present intake of students would yield, after 1961, more doctors than are likely to be needed, and a reduction of the present intake by about a tenth, as soon as practicable, would be wise.

The committee were appointed because it has been widely felt that the profession in this country may soon be overcrowded, with consequent unemployment.[2] To the public this idea that there are, or soon may be, too many doctors sounds more than odd: the man who looks after them is almost always in a hurry and often clearly overworked, and general practitioners nowadays seem generally less willing than formerly to sit down quietly and satisfy the patient by going into his whole problem. But when we speak of too many doctors we are not, of course, thinking in terms of the number needed to provide ideal medical care, but simply of the number for whom the nation is willing to offer the kind of livelihood and conditions of work which professional people consider necessary. A doctor may be unemployed, and have to turn to some other occupation, not because he is not needed but because nobody offers him a job of the kind he is trained and prepared to do; and in a profession where so many people have developed highly specialised functions this can readily happen even if there are enough jobs, of a kind, to employ everyone.

To make their task a shade less impossible, the committee decided to ignore the inevitable but unpredictable changes in the demand for certain kinds of work—e.g., those following discovery of new remedies for tuberculosis, which have already caused unemployment, in some degree, among chest physicians. Very reasonably, they have confined themselves to broad totals, implying that, even though one doctor may not be interchangeable with another, the existence of unsatisfied demands in one quarter will largely absorb excess of labour in another. Even so, however, they have had to make some large assumptions, which we can only hope will be justified. Though they do not recommend that the present upper limit on the size of the family doctor's list should be lowered, they foresee an addition to the number of principals in general practice sufficient to reduce the average number of patients per list to 2500 in non-rural areas and 2000 in rural areas, which would mean an addition of 625 principals (for Great Britain as a whole) above the 1955 figure. Such an addition, we are sure, is desirable; and the committee represent it as a continuation of the trend between 1952 and 1955; but since it seems to involve reduction of many existing practitioners' lists, we do not share the committee's apparent confidence that it will happen soon—unless of course the situation can be changed by new arrangements, comparable to those made under the Danckwerts award. This appointment of 625 new principals is needed to remove a "deficiency" in the service, and the committee recognises elsewhere in general practice other deficiencies bringing the total of notional and other vacancies to 780 in 1955. The whole would be met, with a handsome margin, by the proposed reduction, by the end of 1962, of 1060 in the number of doctors employed by the Armed Forces. The committee's estimate for additional doctors needed to meet further likely expansion is 465 per annum in 1955–60, 440 per annum in 1960–65, but only 280 in 1965–70. These figures allow for "an appreciable rise in the ratio of doctors to population" but still would not absorb the full output of our medical schools at their present size.

From the public as well as from the professional standpoint, an excess of doctors would be a bad thing. Though admittedly a great many patients in this country need more and better medical care than they are getting, the deployment of more doctors is not the only or the best means of giving it to them. The alternative is to create around the doctor a team whose members can together provide all the various kinds of help patients require—to create conditions of work which enable him to use his time to the best advantage (which will often include sitting down for half an hour's talk with somebody who wants half an hour's talk). When the National Health Service was started, fears were expressed lest the quite obvious under-doctoring of the country should lead politicians to insist that medical schools should step up their production, even though for a time they had to lower standards. These fears were not realised: though the schools increased their intake, they did so chiefly because more young men and women (including many from the Forces) wanted to be trained. Official policy, at the outset of the service, was not in favour of diluting the profession and thus lowering its standards: on the contrary it put all its emphasis on the alternative—namely, better organisation of medical work so that, through hospital or health centre, one doctor could do more for his patient. As everybody knows, this improvement of general practice by better organisation has not yet been effected: health centres as originally planned were too expensive and perhaps too impersonal, and, though some admirable pioneer work has been done here and there, and will eventually extend, the public in general has not yet got either many more family doctors or much more efficient use of those that exist. Clearly, however, both Government and profession are committed in principle to the policy of efficiency as against the policy of dilution: Ministers of Health have, for example, repeatedly

1. A brief summary appears on p. 1057.
2. See *Lancet*, 1951, ii, 331; 1955, i, 439.

commended the idea of the team as a means towards really good general practice. In a country where there has been so much development of the "professions ancillary to medicine", teamwork under the guidance of a relatively small number of good doctors can in fact do more to help people than the individual services of a larger number of doctors who may be equally capable but have inadequate assistance.

Granted that, if anything, educational standards need to be raised rather than lowered, what should now be done? Having cleared themselves of the alleged intention of diluting the profession by flooding the medical schools, the Government are now apparently accused of the opposite crime of trying to economise on the N.H.S. by keeping the schools empty. All that they seem to have actually done in this direction, so far, is to appoint the Willink Committee; and now that they have published its report we hope they will continue to avoid positive interference with medical education, leaving the profession full responsibility for acting or not acting on the recommendations before it. The Government could, of course, insist on a reduction in the intake of students, because, through the University Grants Committee, they provide much of the money on which the schools are run. But this would annoy everybody without doing any good whatever. With the committee's facts and conclusions before them, medical schools are hardly likely to think it any longer an extraneous duty to expand their schools, and some at least will be thankful to feel that they need no longer strive to train more students than their resources permit without strain. Even a small lessening of the annual entry will sometimes be of great help to schools which are anxious, above all, to improve the quality of their teaching; and for those which regard their present entry as an optimum there is the committee's important hint that British schools would be doing a service to the Commonwealth if they could take rather more students from overseas. Meanwhile what is really to be feared is not so much that first-rate young men and women will have to be turned away as that they will no longer present themselves.

Hæmochromatosis and Transfusional Siderosis

DEPOSITION of iron in the tissues is common to both hæmochromatosis and transfusional siderosis. But there resemblance ceases; and present evidence favours the view that these two are distinct and should be handled differently.

FINCH and FINCH [1] apply the term "hæmochromatosis" to "a general increase in body iron stores with resultant tissue damage." In idiopathic hæmochromatosis—the so-called "bronzed diabetes"—accumulations of iron in the tissues lead to the clinical signs of liver-disease, diabetes mellitus, heart-disease, and pigmentation of the skin, with the pathological findings of cirrhosis of the liver, atrophy of the pancreas, and deep brown pigmentation of liver, pancreas, myocardium, and other organs owing to the deposition of iron pigment. FINCH and FINCH point out that some studies of iron absorption in idiopathic hæmochromatosis indicate a pronounced increase of absorption of administered iron, varying from 20% to 60% of the dose, whereas others have not revealed such a change. These workers suggest that such differences may be related to the different stages of the disease, since absorption seems to be more consistently increased in younger patients than in older patients whose iron stores are already laden. There is now general acceptance of GRANICK's [2] view that idiopathic hæmochromatosis is due to an inborn error of metabolism in the intestinal mucosal cells which leads to slightly increased absorption of iron from the diet, of the order of 3–5 mg. daily throughout life. Since excretion of iron is not correspondingly increased, iron gradually accumulates in the tissues, and the depositions are found as hæmosiderin. By middle age this accumulation has reached massive proportions. SHELDON [3] found as much as 39 g. of iron in the liver alone; KLECKNER et al.[4] found 10·8–27·1 g. of iron in the liver and 168–340 mg. of iron per 100 g. of wet tissue in the pancreas.

If we agree that these iron depositions are the cause of the functional failure of liver, pancreas, and other organs, treatment should aim at reducing iron absorption from the intestine and at reducing the accumulations of iron in the tissues. Reduction of iron in the diet or diminution of absorption of iron is not easily achieved; but reduction of the accumulated iron in the tissues has proved much more practicable. BEYERS and GITLOW [5] showed that the hæmosiderin in the tissues in hæmochromatosis was available for hæmoglobin synthesis; consequently, since every 500 ml. of blood contains about 250 mg. of iron, repeated venesection should eventually reduce even the larger iron accumulations. A therapeutic programme of this kind was tried successfully by FINCH in 1947. MCALLEN et al.[6] review experience with phlebotomy for idiopathic hæmochromatosis and give data about 7 patients of their own who had this form of treatment. They carried out venesections of 350 or 500 ml., weekly whenever possible, continuing until the hæmoglobin level was reduced to 10–11 g. per 100 ml.; to attain this result amounts of blood varying from 16 to 70 litres were removed, and this took eleven to fifty-three months. By the end of the course the body's iron stores were almost exhausted and serum-iron levels were reduced to normal. Liver-biopsy before and after treatment showed that the iron deposits had indeed vanished from the liver tissue, but the excess of fibrous tissue was unchanged. After treatment the serum-iron tends to rise again, and if this happens further venesections of up to about 2 litres of blood per annum will prevent reaccumulation of iron.

Transfusional siderosis is the name given to the accumulation of iron in the tissues when patients with chronic anæmia are treated by frequent blood-transfusions for months or years. If these iron deposits provoke tissue change of the same sort as in idiopathic hæmochromatosis, then regular transfusion treatment should be kept to the minimum. Cases have been reported of cirrhosis of the liver in transfusional siderosis. Nevertheless many workers consider that iron deposited from transfused red cells does not provoke tissue reaction. KLECKNER et al.[4] studied the clinical and pathological findings in 18 cases of hæmo-

1. Finch, S. C., Finch, C. A. *Medicine, Baltimore*, 1955, **34**, 381.
2. Granick, S. *Bull. N.Y. Acad. Med.* 1949, **25**, 403.
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5. Beyers, M. R., Gitlow, S. E. *Amer. J. clin. Path.* 1951, **21**, 349.
6. McAllen, P. M., Coghill, N. F., Lubran, M. *Quart. J. Med.* 1957, **26**, 215.

chromatosis and 16 of transfusional siderosis, and pointed out many differences. For example, cirrhosis of the liver was present in all 18 patients with hæmochromatosis, but in only 1 of the 16 transfusion patients; atrophy of the pancreas was found in 12 of the hæmochromatosis patients, but in none of the transfusion patients; the figures for pigmentation of the skin were 13 and 1, for hæmosiderin deposits in the myocardium 13 and 1 and in the interstitial tissue of the testis 8 and 1. KLECKNER et al. noted in particular the case of a patient who had received 291 blood-transfusions; the chemically estimated content of iron in various tissues was as great as, or even greater than, amounts found in idiopathic hæmochromatosis, but no cirrhosis of the liver was present and he had had no diabetes. They concluded that "hæmochromatosis is a unique disease" and that simple overloading of the body with iron will not produce the syndrome.

CAPELL et al.[7] have described the pathological findings in 5 patients who had received regular blood-transfusion therapy for the control of chronic anæmia. In 1 of these cases 415 litres of blood, containing 210 g. of iron, was transfused over twelve years, and 55·5 g. of iron was recovered from the liver; in another, 305 litres of blood, containing 152 g. of iron, was transfused in six and a half years, and 87·5 g. of iron was present in the liver. In both cases there was pronounced brown pigmentation of the liver and many other organs. But, despite the accumulation of iron in amounts larger than have been recorded in idiopathic hæmochromatosis, there was no cirrhosis of the liver or evidence of undue fibrosis in any organ of either patient. Both patients had gross enlargement of the liver, but this proved to be due to some hyperplasia of the liver-cells and distension of the cytoplasm with iron material, and to broadening of the portal tracts by accumulation of iron-laden macrophages. CAPELL et al. do not deny that there have been several reported cases in which transfusional siderosis and cirrhosis of the liver coexisted, but they point out that few of these accounts give all the desirable information—i.e., the total amount of blood transfused, from which the total administered iron can be determined, and an estimate of the total iron found in the liver post mortem. CAPELL et al. collected all the accounts that give this full information, and they found that cirrhosis of the liver apparently develops only when the total liver-iron is about the same as, or actually greater than, the total iron administered as blood. This suggested that in these cases a large proportion of the iron came in fact not from the blood but from some other source; in their own cases only 5–40% of the iron given in blood was found in the liver. CAPELL et al. recall that the many attempts to induce experimental fibrosis of organs by administering iron overloads have all failed. The figures for total iron in patients in whom cirrhosis develops suggest that, as in idiopathic hæmochromatosis, the accumulations of iron are due largely to continued absorption from the alimentary tract. CAPELL and his colleagues put forward the tentative suggestion that iron derived from effete red cells is relatively bland, perhaps because it has passed through the reticulo-endothelial system; whereas iron absorbed through the gut and directly deposited in the tissues may be relatively irritant.

7. Capell, D. F., Hutchison, H. E., Jowett, M. *J. Path. Bact.* 1957, 74, 245.

From all this information we can see that the link between iron deposition and pathological fibrosis is securely established only in idiopathic hæmochromatosis; there is much evidence pointing to the conclusion that iron deposited from the breakdown of transfused blood will not by itself produce any changes other than mechanical distension of the organ. Further quantitative information is needed to show why a few patients receiving multiple transfusions do have liver cirrhosis. The evidence suggests that we do not need to be over-fearful about providing life-saving blood-transfusions, lest cirrhosis of the liver develops in the long run. And it supports the present practice of treating idiopathic hæmochromatosis by repeated venesections to exhaust iron stores.

Precancerous Changes in the Breast

EIGHT thousand women a year die in Great Britain from cancer of the breast, despite the attempts of the past fifty years to elucidate the genesis of the disease and to devise more effective means of treatment. The clinical pathologist often has the heavy responsibility of deciding whether the microscopical changes in the walls of the breast-ducts are precancerous or not. The epithelial changes preceding cancer—ranging from hyperplasia to papilloma and intraduct carcinoma—move gradually from stage to stage, each stage merging into the next so far as microscopical appearances are concerned. Experience of other graded neoplastic changes shows that not all papillomas become malignant, and that carcinomas may arise in sites where previously there have been only the slightest epithelial changes. This is well known to be true of carcinoma of the bladder. Experimentally, VAN RIJSSEL[1] showed that in mice the tendency for benign epithelial lesions to become cancerous varied between different strains and was probably genetically conditioned.

How then is the pathologist to determine whether intraduct epithelial changes in the breast are likely to be the precursors of cancer? It is easy to play for safety and to advise simple mastectomy where any doubt exists; and many pathologists adopt this course, knowing that simple mastectomy promises a certain cure. But this is a mutilating operation, and it takes no account of the state of the other breast. A new approach to the assessment of precancerous breast changes is therefore greatly to be welcomed.

JACKSON and ORR[2] have studied 400 cancerous breasts removed at operation, in 5 of which there was also Paget's disease of the nipple; 3 cases of Paget's disease without deep carcinoma were also studied. ORR, who has devoted many years to the experimental study of epithelial and stromal changes in carcinogenesis, maintains that carcinogens act upon both epithelium and stroma, the changes in the stroma being in general both earlier and more constant. But many others believe that the first action of the carcinogen is on the epithelial cells, stromal changes being secondary.

The conclusions of JACKSON and ORR are based on the naked-eye and microscopical changes in ducts in the tumour, as well as in the sector in which the tumour lies and in other sectors of the breast. As regards the ducts within the tumour, they find that these are more

1. van Rijssel, Th. G. *Acta Un. int. Cancr.* 1956, 12, 718.
2. Jackson, J. G., Orr, J. W. *J. Path. Bact.* 1957, 74, 265.

crowded than those in the surrounding sector, that their lumens are often partly or completely obliterated by collagen, that many contain calcium, and that they may be the seat of expansile intraduct carcinoma of various types. In 2 cases where no carcinoma was found, though all the clinical signs were in favour of this diagnosis, similar crowding of ducts had taken place, suggesting that these were instances of atrophic scirrhous carcinoma. Ducts outside the tumour but in the tumour-containing sector showed the above changes, as well as fibrous obliteration of some of the ducts, increase in the subepithelial collagen with or without epithelial hyperplasia, and accumulation in the lumen of amorphous material containing cholesterol clefts. JACKSON and ORR make two suggestions about these two last changes—that subepithelial collagen in ducts when associated with irregular epithelial hyperplasia (a combination which they term "carcinomatous hyperplasia") is the real precancerous lesion, and that the material accumulated within the ducts contains the carcinogenic agent. Similar changes were found less commonly in ducts in non-affected sectors, and they suggest that their presence might account for the occurrence of two tumours in the same breast. In 8 cases of Paget's disease, in 3 of which there was no deep tumour, intraduct carcinoma or carcinomatous hyperplasia was present. JACKSON and ORR finally conclude that the connective-tissue changes in ducts in their material as a whole were more constant than the epithelial changes. As another facet to their work they made a retrospective study of precancerous lumps removed surgically from the breast. In 3 of these carcinomatous hyperplasia was present, and in each case true carcinoma ensued four to eight years later.

Formerly, the duct changes discussed here were regarded as evidence of the healing of intraduct cancer.[3,4] The thesis of JACKSON and ORR that the fibrosis precedes the epithelial hyperplasia and is not stimulated by the cancer cells leads them to conclude that, when associated with atypical epithelial appearances, it is the harbinger of cancer. Conversely, epithelial proliferation or epitheliosis unassociated with fibrous changes in the duct wall is less serious. JACKSON and ORR are not prepared to commit themselves on the significance of subepithelial collagenesis without epithelial changes. This approach to the interpretation of precancerous changes in the human breast may prove to be of great practical value; but the views of JACKSON and ORR are in some respects open to question. If the first change in the ducts is fibrosis of the walls leading to shortening of the duct systems, why is nipple retraction not observed before the cancer develops? It is a little unreasonable to postulate the presence of atrophic cancer in an area clinically thought to be cancerous yet microscopically shown to be non-cancerous. There is still no proof that the secretion accumulating in the ducts between the tumour and the nipple has carcinogenic properties; when this was tested experimentally[5] no tumours were produced, though some unusual reactive changes were observed. Finally, no account is taken of the fact that metastatic deposits of breast cancer in lymph-nodes often produce an abundant fibrous reaction, which cannot be said to precede the metastasis.

3. Muir, R. *ibid.* 1939, **49**, 299.
4. Muir, R., Aitkenhead, A. C. *ibid.* 1934, **38**, 117.
5. Orr, J. W. *Acta Un. int. Cancr.* 1956, **12**, 682.

Annotations

RENAL INJURIES

OWING to the protection afforded by the lower ribs and adjacent muscles of the trunk and abdomen, injuries of the kidneys are relatively uncommon. Such injuries may give rise to difficulties in diagnosis and management. A majority are caused by severe direct violence, and some by penetrating wounds; and a few follow sudden muscular exertion—for example, an "air shot" at golf. In deciding on treatment, it is important to remember that neighbouring viscera, such as the liver and spleen, may have been seriously damaged at the same time, and that where rupture follows trivial violence the kidney may have been rendered vulnerable by pre-existing disease. In such instances early intervention may be imperative. Otherwise the choice between conservatism and surgical treatment will depend largely on the presumed degree of renal damage and the risks of hæmorrhage and urinary extravasation.

Parkhurst and Landsteiner[1] classify renal injuries into four grades, ranging from minor contusion to major shattering of the kidney with urinary extravasation outside the capsule; the two intermediate types comprise severe parenchymal injury with rupture of the capsule but without damage to the drainage system, and combined rupture of the parenchyma and drainage system with the capsule remaining intact and thus limiting extravasation. This classification accords with that proposed by Harrison.[2] Although satisfactory from an anatomical viewpoint, it is not always easy to apply precisely in clinical practice; for even with routine early pyelographic studies, differentiation of the intermediate groups may prove difficult on account of poor excretion due to shock, parenchymal compression, or the presence of clots.

This may not be of great moment, because Parkhurst and Landsteiner found that most cases in these intermediate categories did well with conservative treatment, although in a few recovery might possibly have been hastened by operation. In cases of major renal damage associated with extravasation, early operation is the treatment of choice, according to Parkhurst and Landsteiner, though in nearly all cases diagnostic procedures can first be undertaken.

This view suggests a compromise between the opinions of the protagonists of immediate surgery on the one hand and of conservatism on the other. Most urologists agree that severe sustained hæmorrhage is an indication for early intervention, but that urinary extravasation does not call for the same urgency. The relation of renal scarring and infarction to subsequent hypertension remains problematical; but experience indicates that such an association, if it ever exists, is so unusual, that consideration of it need not affect the initial management.

BEAT KNEE

IN coalmines the face-worker spends much of his time, particularly in the smaller seams, on his knees. Most of the consequent knee lesions conform to the usual patterns—degenerative arthritis, ligamentous strains, and cartilage tears. But in addition miners are subject to "beat knee," which is defined under the Industrial Injuries Act as "a subcutaneous cellulitis or acute bursitis arising at or about the knee." As a diagnostic term this has little to commend it, since it embraces a wide range of pathological changes without a specific ætiology. In the mines important influences include local irritation, from pressure and the abrasive effects of stone and coal dust, and sweating. Roantree[3] has classified 102 cases of beat knee into inflammatory lesions, pressure lesions, and other conditions

1. Parkhurst, E., Landsteiner, E. K. *Surg. Gynec. Obstet.* 1957, **105**, 393.
2. Harrison, J. H. *ibid.* 1940, **70**, 93.
3. Roantree, W. B. *Brit. J. industr. Med.* 1957, **14**, 253.

(for which other diagnostic labels would be more appropriate). The inflammatory lesions begin as a follicular staphylococcal infection, which may lead to abscess formation, cellulitis, or lymphadenitis. These infections respond well to chemotherapy; disability is brief, and return to full work at the coal face rapid. The pressure lesions are associated with effusions into bursæ, usually in front of the knee. Roantree finds that such lesions may be compatible with full efficiency—indeed, few coal-face workers have normal knees. It is the increase in size of the bursa, accompanied by pain, which makes work difficult or impossible, and at this stage the bursa contains blood. Aspiration is of value in the treatment of these lesions, provided the skin is clean and the bursa does not communicate with the knee-joint. Rest from kneeling is important, and must often be protracted. Surgical excision of the bursa involves a long period of disability, and many miners cannot return to the coal-face after operation.

ARSENIC AND POTATOES

THE spraying of crops with toxic chemicals is now common practice on most farms in this country. The chemicals are used mainly as weed-killers and insecticides and their application is controlled by regulations defined in law. The aim of all concerned—research-workers, chemical manufacturers, and Government administrators—is the production of non-toxic substances which will be equally effective but safe both to spray-operators and consumers. There is now disquieting evidence,[1] however, that potato crops are being widely sprayed with sodium and potassium arsenite in place of the sulphuric acid hitherto used to achieve rapid destruction of the potato tops (haulms).

Sulphuric acid has been used for many years as a defoliant of potato crops. The haulms are destroyed rapidly and the tubers can be spun out of the ground by a machine without the bulky haulms getting in the way: the crop is then gathered by hand. The replacement of sulphuric acid by sodium and potassium arsenite sprays seems a retrograde step. These arsenite sprays are not more efficient as defoliants, but they are easier to handle because they do not corrode the metal parts of machinery or burn clothing. The worst that can happen to spray-operators or crop-pickers after sulphuric-acid spraying are superficial acid burns. Arsenites, on the other hand, are extremely toxic substances. Acute arsenic poisoning is possible, and arsenites are also a potent cause of dermatitis. Furthermore, Bradford Hill and Faning[2] showed in 1948 that the mortality from cancer among factory-workers exposed to arsenite dust was significantly greater than that found in three other occupational groups living in the same area. Both the spray-operators and the crop-pickers are liable to exposure. As Whitehead[1] points out, potato pickers are often women who take their children into the fields with them, and the children play there while the mothers work. Sandwich meals are often eaten in the fields, and there is no provision for washing.

The possible hazard to the consumer is slight, but it should not be neglected. The public analyst of Coventry is reported[3] to have found sodium arsenite in the skins of five out of seven samples of potatoes examined; and his advice is to peel all potatoes before cooking them. (Two of the samples came from the Warwick area, where Whitehead[1] has investigated four operators who had been spraying arsenite; three showed excessive excretion of arsenic in the urine and one had vomiting and diarrhœa.) Certainly the contamination of potatoes with small quantities of a known poison has little to commend it. Obviously, the residue of arsenic on potatoes, expressed as parts per million, could be misleading, since so many more potatoes are consumed than, for example, soft fruit, such as strawberries. If the practice of spraying potato crops with arsenicals immediately before harvesting is to continue, then stringent regulations for their use should be instituted and enforced; but the replacement of arsenical sprays by less dangerous substances seems a much wiser course.

1. Whitehead, T. P. *Lancet*, Nov. 9, 1957, p. 953.
2. Bradford Hill, A., Lewis Faning, E. *Brit. J. industr. Med.* 1948, **5**, 1.
3. *Birmingham Post*, Nov. 12, 1957.

NEUROLOGICAL DISTURBANCES IN PULMONARY INSUFFICIENCY

NERVOUS tissue is more vulnerable than any other to metabolic disturbances. In the words of Haldane and Priestley[1]:

> "With severe and prolonged exposure to want of oxygen the nervous after-symptoms are of an extremely formidable nature, and often end in death . . . the patient does not recover at once on removal of the oxygen want, as in short exposures."

In respiratory failure, anoxia is associated with carbon-dioxide intoxication; and the neurological disorder may dominate the clinical picture.[2-4] Austen et al.[5] have described three patients with lung and heart failure who had been thought to have brain tumours on account of headache, papillœdema, confusion, and twitches; and a fourth without papillœdema but with a striking disorder of movement that had been presumed to be myoclonus. In each case there was anoxæmia, hypercapnia, acidosis, and heart-failure due to inadequate alveolar ventilation, complicating long-standing lung disease. When the alveolar under-ventilation and its metabolic complications were corrected the neurological manifestations disappeared.

For months all four patients had been drowsy, irritable, and confused; and on admission they were breathless and cyanosed. Two of them vomited. All had steady intense headache—frontal, occipital, or general—worse at night and in the early morning. In the three patients with papillœdema the cerebrospinal-fluid (C.S.F.) pressure was greatly raised.

Electromyography showed momentary interruption of the normally continuous action-potentials. This, together with the freedom from twitching during rest, distinguished the muscular disturbance from myoclonus.

Papillœdema is rare in pulmonary heart-disease, where it must result from the coincidence of congestive heart-failure, hypoxia, hypercapnia, acidosis, and increased C.S.F. pressure. Hypoxia and hypercapnia cause cerebral œdema.[6,7] Hypercapnia and acidosis cause cerebral vasodilatation and allow an increase in cerebral blood-flow.[8] The resulting increase in filtration pressure across the choroid plexus leads to an increase in C.S.F. pressure.[9] A rise in venous pressure alone also raises the C.S.F. pressure but does not cause papillœdema—e.g., in patients with superior mediastinal obstruction. Chronic hypoxia by itself may not greatly disturb consciousness, but may make the nervous system more sensitive to other metabolic changes.

In the treatment of anoxic cor pulmonale with oxygen the physician tries to dispel the delayed effects of anoxæmia without inducing undesirable immediate effects of increasing respiratory acidosis. Three of Austen et al.'s patients were given oxygen; and all three became unconscious when the arterial carbon-dioxide tension rose, though anoxia had been corrected. The rate of oxygen administration should be controlled by the state

1. Haldane, J. S., Priestley, J. G. Respiration; p. 204. Oxford, 1935.
2. Westlake, E. K., Simpson, T., Kaye, M. *Quart. J. Med.* 1955, **24**, 155.
3. Sieker, H. O., Hickam, J. B. *Medicine*, 1956, **35**, 389.
4. Simpson, T. *Lancet*, July 20, 1957, p. 105.
5. Austen, F. K., Carmichael, M. W., Adams, R. D. *New Engl. J. Med.* 1957, **257**, 579.
6. McMichael, J., Lennox, B. *Lancet*, 1949, ii, 1057.
7. Simpson, T. *Brit. med. J.* 1954, i, 297.
8. Kety, S., Schmidt, C. F. *J. clin. Invest.* 1948, **27**, 484.
9. Patterson, J. L., Heyman, A., Duke, T. W. *Amer. J. Med.* 1952, **12**, 382.

of the patient's consciousness rather than by his skin colour. Simpson [7] has lately pointed out that the ill effects of carbon-dioxide narcosis may be reversible, whereas those of unrelieved anoxia are not; and he has drawn attention to the value of long-continued administration of oxygen at low rates of flow. Austen et al.'s three patients recovered under treatment by intermittent positive-pressure respiration; and after treatment for heart-failure these three and the fourth all returned to work.

ROAD-MENDING AND CLEAN AIR

IT is easy to understand that black smoke belching from chimneys perched on dark satanic mills is unhealthy, and we realise that domestic chimneys and the invisible exhausts of motor vehicles hold similar dangers. Machines used for road repairs obviously contaminate the air, but come to mind less readily; they are not mentioned in the Clean Air Act. When roads are resurfaced or relaid, and when tram-rails are torn out, much bitumen or asphalt is often used; and the necessary heat treatment, with multi-oil fuel jets and burners, results in heavy accumulations of smoke. In his report for 1956, Dr. W. A. Horne, medical officer of health for Glasgow, draws attention to this nuisance; his engineers have managed to reduce the smoke production by changes in the operating procedure and in the plant itself.

These machines probably contribute but little to the total atmospheric pollution, though, as Sir Graham Sutton has pointed out,[1] smoke discharged at ground-level produces vastly greater concentrations there than the same quantity discharged at a height. Moreover, their operations are usually intermittent—though they may continue in one place for weeks on end. But where they work, as all know who have choked on their acrid fumes, these machines can be a serious nuisance. In foggy weather they might even be fatal to an unlucky patient with severe bronchitis who lived or worked near a road-repair site. Those who use such machines should do all they can to reduce smoke emission, and avoid operations altogether at times of fog and temperature-inversion.

LUMBAR SYMPATHECTOMY

LUMBAR sympathectomy has been widely practised in the treatment of arterial disease, although opinions on its value differ considerably. This confusion stems from two main roots—first the failure to select appropriate cases for the operation, and second the lack of certainty as to its precise aim: is it to warm uncomfortable feet, to relieve claudication, to heal gangrene, or to preserve the limb? Smithwick [2] holds that the failure to obtain necessary data before lumbar sympathectomy is the reason for its unpredictable outcome. This basic information falls into four categories: assessment of pulsation of the main vessel; the flushing-time in the periphery of the limb; skin-temperature studies; and digital plethysmography. Smithwick places a good deal of reliance on the flushing-test. For this the extremity is raised at an angle of 45° above the horizontal, and the blanching-time is noted. The patient then sits up, allowing the legs to hang freely, and the interval before onset of a pink flush is recorded. A flushing-time of less than 20 seconds is required for a successful outcome to sympathectomy; 21–30 seconds is borderline; and when the flushing-time is over 30 seconds the situation is virtually hopeless.

With these tests in mind, Smithwick [1] finds that of 100 patients submitted to sympathectomy 94 improved; of the 70 with claudication 51 improved. 29 of his patients had ulceration or impending gangrene of the toes, and minor amputations were required in 9 of these.

In this series, as in others, it is difficult to be sure that the improvement was directly due to the operation. It is not hard to estimate whether a foot has been made warmer by sympathectomy; but, in contrast, the clinical assessment of claudication is fraught with difficulties, and plethysmographic studies show that muscle blood-flow is not dramatically influenced by interruption of the autonomic nervous system. Possibly an approach from the other side is easier: which cases do badly with sympathectomy, and when is it contraindicated? Most surgeons find that if the patient has severe rest pain, ischæmic forefoot œdema, gross soft-tissue wasting, advanced necrosis or osteitis, rapidly progressing disease, or severe associated diabetes, lumbar sympathectomy is of little avail and sometimes accelerates the course of the disease.

The sceptical will hold that sympathectomy has a place in the treatment of limbs affected by minor nutritional lesions or in patients made uncomfortable by the coldness of the extremity. But there is no denying that lumbar sympathectomy seems occasionally to reverse the fate of a rapidly deteriorating limb.

1. See *Lancet*, Oct. 12, 1957, p. 737.
2. Smithwick, R. H. *Surgery*, 1957, **42**, 415.

BLINDNESS IN INFANTS

OPHTHALMOLOGISTS and pædiatricians are faced from time to time with an anxious mother who thinks that her infant is not taking notice of things as a normally developing infant should. Often the child is found to be mentally and physically normal; the pupils react and the fundi are healthy. As the optic disc in infants tends to be pale, the question of optic atrophy arises in doubtful cases; but the diagnosis of early optic atrophy is particularly difficult, for the demarcation between the normal and pathological is by no means as definite as in the adult. Cortical blindness has to be considered. It has even been suggested that some of these children have rodless retinæ—a suggestion based on the mistaken assumption that congenital absence of rods has been established in blind mice. Clearly what the older clinicians called congenital amaurosis often presents as great a puzzle today as it did in the past.

Alström and Olson [1] have helped to clarify this problem. They found that, of the children who have passed through the one central blind school in Sweden since 1897, some 6% had been admitted as suffering from "congenital chorioretinitis." On tracing these children family groups could be established—in all, some 105 families—in which a clear picture emerged of an affection which at an early stage consisted in total or subtotal blindness with a normal or near normal fundus, and at a later stage of chorioretinitis with moderate optic atrophy—never so severe as that in retinitis pigmentosa. Some 10% of children with this disorder had cataract, which was commoner in the older age-groups. The frequency of conical cornea also increased with age but never reached the level of cataract. Nystagmus was a fairly constant concomitant, and even in the youngest children the electroretinogram almost always showed no response. There were no significant general associations. These observations were made on an impressive total of 175 cases. Genetic analysis showed that the affection was a simple recessive, spread throughout Sweden, though at unequal intensities in different areas. On the available material the mutation-rate has been estimated at $2{\cdot}3\text{–}10^{-5}$.

One obvious question is the extent to which early cases of this affection differ from early cases of retinitis pigmentosa. Both are recessive, both are presumably congenital, in both the fundus is normal during the early stages; but, whereas in retinitis pigmentosa blindness supervenes only after a period of relatively normal functioning of the retina, in this newly described entity the retina never functions. Pathological studies may help to clarify the relation of these two disorders.

1. Alström, C. H., Olson, O. Heredo-retinopathia congenitalis. *Hereditas, Lund*, 1957, **43**, 1.

Points of View

THE STRATEGY AND TACTICS OF EXPERIMENTATION *

C. W. HUME
M.C., B.Sc. Lond.
SECRETARY-GENERAL, UNIVERSITIES FEDERATION FOR ANIMAL WELFARE

STRATEGY

Lloyd Morgan put a fox-terrier into a yard enclosed by a picket fence, and the dog had to find an answer to the question: "How do I get out of here?" His method was to push his nose between the pickets in one space after another at random, and eventually he happened to lift the latch. "This line of attack is called 'trial and error,' because it consists in trying many leads, most of which turn out to be false leads or errors." (Woodworth and Marquis 1949.) It may also be called "empirical," in contrast with the following kind of animal behaviour, which entails what is called "insight." One of Köhler's apes, having learnt to hook a banana into his cage with a long stick, had next to find an answer to the question: "How do I get hold of the banana with sticks that are too short to reach it?" In playing with two shorter sticks which could be fitted together he happened to join them. He at once ran to the front of his cage and tried the experiment of reaching for the banana with the compound stick, an experiment which gave a positive result (Köhler 1925).

Sometimes a research-worker whose mind runs to empirical or trial-and-error methods will get there in the end, but the born scientist uses insight; by a kind of intuition he hits upon a clue, uses the clue to ask himself the right questions, and then plans experiments to answer the questions, yes or no. But your trial-and-error-empiricist, like Lloyd Morgan's terrier pushing his nose industriously into one space after another, does not begin to see his way to the goal until he has got there.

EMPIRICISM VERSUS INSIGHT IN PHARMACOLOGY

The point may be illustrated by reference to a review (*Nature* 1953) of a report written by two pharmacologists who had screened no fewer than 3500 organic compounds for action against the tubercle bacillus. The reviewer commented as follows. The aim, he said, was to discover or invent "a chemical remedy which will eradicate, completely, virulent tubercle bacilli from human tissues without causing injury to the host cells. The natural approach for the chemist would be to design or select molecules likely to become involved in the bacillary metabolism." But the authors "believe that the only method that offers promise of early success is random screening, and they do not hesitate to claim that there should be no basis for selection of compounds other than availability. The sentence—'The random selection of compounds to be tested should be adhered to as strictly as possible'—has a kind of lunatic flavour about it."

The reviewer continued:

"Finding *the* chemotherapeutic agent for tuberculosis is a difficult problem, but it will scarcely help the search to throw reason to the winds. There are known nowadays a number of widely different types of molecule of synthetic and natural origin which exert a considerable suppressive effect on the tuberculous process in man and in animals. This knowledge provides a rational starting-point for structural tailoring which may lead to the production of substances of greater activity and lower toxicity. Alternatively, an intensive study of the mechanism by which any one of these substances interferes with the metabolism of the bacillus may provide an important clue which would guide further synthesis. This will be a difficult but perhaps not unrewarding investigation. If a greater proportion of the resources which have been used by commercial firms in screening potential anti-tubercular substances were diverted to the study of the chemistry and biochemistry of *Mycobacterium tuberculosis*, progress would be eventually more rapid."

The results of this vast application of the empirical method were meagre. Of eleven compounds shown to exert a repressive effect on tuberculosis, no fewer than ten had already previously been known to have this property, and the reviewer remarked: "Since the discovery of activity in these compounds by various workers was attained by following a lead, however slender, the heroic empiricism of the method of random selection does not inspire confidence."

We must make a distinction between this unjustifiably empirical method of searching for a substance having a prescribed property, on one hand, and on the other the testing of a totally new compound to find out what unknown properties it may have. Here a certain amount of trial and error is perhaps inevitable, though it can be kept within reasonable limits by means of hard thinking.

EMPIRICISM VERSUS INSIGHT IN GENETICS

Illustrations of the superiority of insighted research over empirical research might also be drawn from the history of genetics. At the beginning of this century the study of heredity was mainly in the hands of the Weldon school, who were industriously measuring biometrical correlations and collecting many data which seemed to get them nowhere in particular. In contrast to these empiricists, Charles Darwin had earlier put forward the explanatory hypothesis of pangenesis, which happened to be untrue but nevertheless stimulated thought. It was followed by Weismann's germ-plasm theory, which was a better approximation to the truth and served as a guide to experimentation. But genetics as we know it was born in 1900, when the rediscovery of Mendel's principles made possible an explanatory hypothesis or clue on the basis of which the decisive experimental work of the Bateson school could be planned. Prof. V. H. Blackman (1956) writes of an incident in the controversy that ensued:

"At a meeting of the Evolution Committee of the Royal Society, Weldon had read a paper on the sizes of the carapaces of a certain population of crabs. Bateson, who considered the results of no biological importance, when asked by the Chairman of the Committee to comment upon Weldon's contribution did so in a single devastating sentence: 'though all science might be measurement, all measurement was not necessarily science'."

Professor Blackman adds

"I may say I have occasionally found it useful to bring this dictum before research students, who are sometimes inclined to believe that so long as they are measuring something they must be advancing science."

THINKING AND EXPERIMENTING

I have spoken as if there were a hard-and-fast line between empirical research, proceeding by trial and error, and insighted research which follows a clue. In fact, however, the difference is quantitative rather than qualitative; the ratio of the amount of thinking to the amount of experimenting that goes into an investigation varies from one worker to another. This ratio was small in the chemical screening project I have referred to, and in some of the biometricians' work on heredity. It was still smaller in a certain research which was undertaken with the object of finding out whether a rat can choose a balanced diet by instinct. Purified samples of the various constituents of a balanced diet, vitamin this and vitamin that, purified proteins, and purified carbohydrates, were offered to the poor animal in separate saucers, and it was invited to make its choice without any help from those blends of smells and tastes or other signs in relation to which the instinct, if it exists, must have been evolved in Nature. Needless to say, the unfortunate rat failed in

* Read at the UFAW symposium on Humane Technique in the Laboratory, May 8, 1957.

his examination, just as we should fail if our papers were set in some foreign language which we did not understand, but the penalty for failure in his case was harsh.

At the other extreme, the ratio of thinking to experimenting was surely maximal when Archimedes, meditating in his bath, hit upon the hydrostatic principle; this was the occasion when he ran home through the streets with nothing on, shouting "Heureka" (which was not his wife's name, as a schoolgirl once supposed). The somewhat similar course followed by a modern crystallographer in inferring from a few X-ray diffraction patterns the structure of a complicated organic crystal, which may have as many as 100 different parameters, has been described thus by Sir Lawrence Bragg (1948):

"The analyst has before him the separate bits of a jigsaw puzzle and he has to fit them together . . . In making guesses at possible arrangements he draws on a wealth of experience . . . I can well remember the intense concentration. One lived with the structure. I am tempted to say one ate, slept and shaved with it. Finally, after six months or longer, and if one were fortunate, everything suddenly clicked into place . . . The successful analysis of one structure often leads to a quite new understanding of a whole range of forms . . . It is all the more important that really key structures should be chosen for examination, as likely ventures in which it is justifiable to sink one's capital."

WASTEFUL USE OF ANIMALS

What has all this got to do with kindness to laboratory animals? Just this: empirical methods are wasteful of experimental material. So long as the worst that happens is that large quantities of expensive chemicals are poured down the drain, nobody need worry except the man who pays for the chemicals; and as a matter of fact most of the 3500 compounds which were screened in the research I mentioned above were tested in vitro.[1] But empirical methods are equally wasteful when animals are used, and in experiments on animals ethical requirements demand, even more strongly than does scientific virtuosity, that an experimenter should not be content with pedestrian empiricism but should plan his experiments in the light of a great deal of preliminary hard thinking. First he will assemble any relevant data which may already be available; secondly he will formulate tentatively, by intuition and hard thinking, a provisional hypothesis which may explain these data; thirdly he will deduce from this hypothesis some implications that can be tested by experiment; fourthly he will design experiments to test these implications, and consult a statistician if he is not sure of his design being maximally efficient; and finally he will evaluate his results. Unless his intuition has been exceptionally lucky, he will then have to see what modifications of his initial explanatory hypothesis are called for.

The difference between the planning of a fully efficient experiment at one extreme, and pedestrian empiricism at the other, is like the difference between the behaviour of Köhler's ape and that of Lloyd Morgan's terrier. It is also like the difference between precision bombing of a military target and the system in which a substantial area surrounding the target is saturated with bombs.[2] The precision bomber hits the mark with minimum civilian damage and waste of ammunition, and a well-planned experiment uses the minimum number of laboratory animals that will yield the required information with the appropriate degree of precision.

1. To forestall comment I quote the following:
"Cycloserine . . . although fairly active *in vitro*, was found to be inactive in mouse and guinea-pig tuberculosis and other infections in animals. It would normally have been rejected, but owing to its virtual lack of toxicity in animals it was tried clinically and found to be highly effective in man. This raises the question as to whether the *in vivo* results in animals are any more reliable than the somewhat discredited *in vitro* technique for the assessment of the value of a new antibiotic." (*Nature* 1957.)
2. Saturation bombing intended to destroy the railway bridge at Avignon killed between 1000 and 2000 civilians but left the bridge intact.

There is some evidence that the empirical approach is characteristic of pre-adolescence: children aged 8–12 years were found to adopt it in solving a simple mechanical problem, while children aged 12–15 years adopted an insighted approach (Piaget 1953).

TACTICS

"The theory of statistics enables an experiment to be planned so that the maximum of information may be obtained from a limited number of observations, and conversely it serves to minimise the number of observations required for a given conclusion; it has thus a humane advantage in experiments which impose any degree of hardship on experimental animals. Formerly the biologist's only resource for increasing precision was to use more animals, but R. A. Fisher and his school have created a new and powerful technique which has revolutionised the inductive method in this respect. Statistical theory enables the cogency of an inductive inference to be measured. It enables the whole of the generalizable information implicit in a given set of observations to be extracted from them, together with a specification of the degree of reliance to be rested upon it." (Hume 1947a.)

It is not only among biologists that a simple faith in very large samples used to be found. I well remember how, in the early days of relativity, a physicist repeated the Michelson-Morley experiment, a laborious process, no fewer than 12,500 times, and believed that he had disproved Einstein's theory. All that he had really done, it seems, was to measure the systematic error of his apparatus (*Science* 1926; but cf. *Rev. mod. Phys.* 1933).

In the case of biology, the use of hundreds of animals in a blindfold quest for precision is mere blundering in the dark, and the precision of an experiment could even be impaired by increasing the size of the sample, if this should entail having to take in a more heterogenous stock.

THE NULL HYPOTHESIS

Fisher's work is based on a concept which he calls "likelihood," by which is meant the probability, as calculated from a given hypothesis, that a given experimental result should be obtained.

Thus, you formulate a hypothesis and propose to test it by the result of an experiment. For this purpose you would wish to calculate deductively from your hypothesis the likelihood that your experiment would yield those observations which it has in fact yielded, so that hence you might draw a conclusion as to the probable rightness or wrongness of your hypothesis. But here a difficulty arises, and Fisher's solution of it is the foundation of his tests of significance. The difficulty in question is that usually your hypothesis will not imply any particular numerical value for the likelihood of finding a given experimental result. For instance, suppose the hypothesis to be that a given dose of an antibiotic affords protection against a given species of bacteria, and suppose that the experimental result shows a certain proportion of successes to failures. The hypothesis tells nothing about the probability of there being such a proportion of successes to failures, since it does not entail any frequency-distribution. Fisher's master stroke is to substitute for this primary hypothesis its contrary, which he calls the "null hypothesis"—that is to say, the hypothesis that the observations are to be explained as the effect not of the antibiotic but of random unidentifiable factors. This null hypothesis does provide a basis for calculating the likelihood that the observations obtained, together with any more unlikely sets of observations, should have occurred by chance; and if it is found that the experimental results are unlikely to have been due to chance, as the null hypothesis supposes them to have been, then that hypothesis is rejected and the primary hypothesis is taken to be correspondingly likely. In other words, the result of the experiment is taken to be significant.

LEVELS OF SIGNIFICANCE

At what level of unlikelihood should the null hypothesis be rejected and the result of the experiment be accordingly treated as significant? The choice of such a level of significance is somewhat arbitrary, but in practice it has been found satisfactory to work to a level of either 5% or 1%, and it is for these levels that statistical tables are usually included in the textbooks. In other words, the result of an experiment is taken to be significant if the odds are 19 to 1 or 99 to 1, as the case may be, against that result, or any more extreme result, being due to chance. No scientific conclusion is ever certain; every experimenter runs a calculable risk of attributing to an assigned cause what might in fact have been due to chance—i.e., to the random effect of undetermined factors. How great is this risk? A man who habitually works to a level of significance of 5% will make this mistake, on the average, once in every twenty experiments. One who works to 1% will do so only once in every hundred experiments.

MATHEMATICS COULD HAVE SAVED MICE

Let us apply these considerations, by way of example, to one of a series of tests actually carried out on an antibiotic. The object of this particular test was to ascertain whether a certain dose would protect mice against *Clostridium septicum*, and the result is shown in table I. Although common sense will tell us by inspection that

TABLE I—TEST OF AN ANTIBIOTIC AGAINST *Clostridium septicum* WITH FIFTY MICE

—	Died	Survived	Total
Controls ..	25	0	25
Treated ..	1	24	25
Total	26	24	50

this result was highly significant, let us calculate a numerical test of significance to see whether a smaller number of animals would have sufficed. Using Fisher's exact method [3] of calculation (Kendall 1943, Fisher 1944, Hume 1947b), we find that the result shown in table I is significant at a level of about 1 in 5,000,000,000,000. In other words, if the experimenter were to repeat his experiment, which took 10 days, continuously once during each subsequent 10 days, he might expect to make a mistake, by attributing to the antibiotic what could also have been due to chance, once in every 135,000,000,000 years approximately.

Now let us suppose that ten mice had been used instead of fifty. The odds are 4 : 1 that the result would have been as shown at (A) in table II, though it might have been as shown at (B). In the first case it would have been significant at a level of about 0·4% (P=0·004), and in the second case at about 2½% (P=0·025). If, then, an experimenter continued to repeat the test every 10 days, how often would he be likely, on the average, to

3. The formula is as follows, the numerals in the numerator being taken from the marginal totals and those in the denominator from the grand total and the observed frequencies:

$$P = \frac{26!\times 24!\times 25!\times 25!}{50!\times 24!\times 1!\times 0!\times 25!} = \frac{26!\times 25!}{50!} = 2\times 10^{-13}$$

where 0! = 1! = 1, and the values of the remaining factorials are given in Fisher and Yates' table XXX. If the smallest frequency had not been zero, it would have been necessary to take the following further steps. Reduce the smallest frequency by unity, and so adjust the remaining frequencies that the marginal totals are unchanged. Recalculate the likelihood for this new 2×2 table. Repeat this operation, reducing the smallest frequency each time by unity and keeping the marginal totals unchanged, until the smallest frequency becomes zero. The fiducial probability P for the original 2×2 table is then equal to the sum of all the likelihoods so obtained, one for each 2×2 table.

TABLE II—THE SAME TEST WITH TEN MICE, IF THE ONE FAILURE WAS (A) LATE OR (B) EARLY

	(A)			(B)		
—	Died	Survived	Total	Died	Survived	Total
Controls ..	5	0	5	5	0	5
Treated ..	0	5	5	1	4	5
Totals ..	5	5	10	6	4	10

attribute to the antibiotic an effect which might also be due to chance? Allowing for the 4 : 1 probability mentioned above, we find that with ten mice per sample he would risk making this mistake once every 3½ years. With twelve mice he would make it once every 10½ years.

Thus about four-fifths of the mice used in this test were unnecessary. The test was one of a series giving similarly uniform responses, with results of roughly the same order of significance. Moreover death from gas-gangrene is not pleasant. But it is easy to guess how the use of this excessive number of animals must have come about. The conventional way of testing such tables is to use χ^2, and the published tables of χ^2 would entirely fail to reveal the wastage that was occurring. Unfortunately Fisher's exact test is but little used, though the computation it entails is not laborious in cases of this sort if the table of factorials be used. When we bear in mind the enormous number of mice used every year, we can guess at the humanitarian advantage that might accrue from an extended use of the tools which statisticians have put into the hands of biologists.

CHOICE OF SAMPLE-SIZE

How can an experimenter decide, before carrying out an experiment, how many animals he should use if he is to avoid wasting them on meaningless precision, and yet be pretty sure of obtaining a significant result if the effect he is looking for really exists? Usually an experiment does not stand alone but forms part of a series; for instance, the experiment cited above formed part of a series of similar tests on the same antibiotic. In such a case experience can enable a roughly suitable decision to be made. A. H. J. Baines has given an exact solution for the particular case of a variance ratio (Hume 1947c), but the whole problem has not, so far as I am aware, been fully explored by statisticians.

Economy in sampling might be achieved at any desired level of significance by the method of serial sampling or sequential analysis, but hitherto this has not been extensively tried out in biology (Finney 1955).

THE ANALYSIS OF VARIANCE

Precision can be greatly increased, and the requisite number of animals per sample correspondingly reduced, by an appropriate use of the analysis of variance. For instance,

> "Up to fivefold or sixfold increases in precision have been reported as a result of segregating differences between individual animals in assays of coal-tar antipyretics in cats and parathyroid extracts in dogs. Twofold to threefold increases in precision as the result of the elimination of differences between litters in the assay of vitamin D in rats were indicated by Bliss." (Emmens 1948a.)

The simplest design of this kind is the randomised block (Fisher 1942a, Finney 1955).

FACTORIAL DESIGN

The factorial design of experiments, developed by Sir Ronald Fisher (1942a) and further elaborated by F. Yates and others primarily for use in agronomy, has been applied also in the laboratory. It has the humanitarian advantage that, if properly used, it greatly reduces the number of animals required for producing a given amount of information, and it has the scientific advantages of indicating the interactions between different treatments and of providing a broad basis for inductive inference. It differs from earlier experimental methods in that, instead of a single

factor being varied while all other conditions are kept constant, two or more factors are varied simultaneously, subject to certain precautions against the confounding of the effects of any factor with those of other factors. The factors may be treatments, such as different drugs given at various dose levels, or they may be such things as litters, strains, cages, or other environmental conditions.

To avoid confounding the effects of different factors, each level of every factor must be combined with each level of every other factor. If, however, all possible combinations of factors were made—if each level of every factor were to be combined with every possible combination of the various levels of the other factors—then, instead of an economy in sampling being effected, the number of observations entailed would increase rapidly as the number of factors increased, and would quickly become enormous. Fisher has overcome this difficulty by using Latin and Græco-Latin squares. By this device one or more of the interactions between factors are confounded with the error and are sacrificed, but the main effects need never be confounded. Thus at least as much information is got as with the one-factor method, and usually more information, and meanwhile the requisite number of observations is greatly reduced.

Economy can be effected by doing a factorially designed experiment with a single Latin square in the first instance. The result may be conclusive, but if it is not—if, for instance, it yields a level of significance of 7 or 10%—it can be repeated with a different Latin square of the same set, and if necessary with further such squares, until by combining the results a decision can be reached. In other words, it is possible to adopt a sort of sequential sampling by means of successive Latin squares, and stop when the combined results become decisive.

A COMMON FALLACY

It seems desirable to call attention here to a common fallacy which arises from the obvious fact that results obtained with a single homogeneous sample may, for all we know, be peculiar to the strain from which the sample was taken. The fallacy consists in supposing that in order to obtain a broad inductive basis a heterogeneous stock should be used. It would be as if you were to estimate the value of a pocketful of silver by counting the coins as coins, without sorting the sixpences, shillings, and half-crowns. The proper procedure is, of course, to use several different homogeneous samples, by using a plurality of pure lines (or preferably F1 crossbreeds), and to allow for the variance between samples; for otherwise the experimenter deprives himself of the possibility of making a relatively precise estimate of the error (Fisher 1942b).

MISSING OBSERVATIONS

Now what happens to a factorial experiment if one or more of the observations are lost? Suppose, for instance, that one of the animals is found to be suffering severe pain, so that it becomes an obligation of honour, as well as of humanity, that it should be painlessly killed in accordance with the terms on which a Home Office licence has been accepted. Is the whole experiment lost? No, for the whole of the information provided by the remaining observations can be recovered by means of the principle of least squares (Fisher 1942c, Emmens 1948b, Wright 1956) and the only information lost is then the information which would have been contributed by the lost observation itself.

TWO QUESTIONS

In relation to the methods of estimating quantities by means of regressions—in bioassay for instance—I should like to invite consideration of two questions.

(1) A great many assays depend on the determination of an E.D. 50 or an L.D. 50—that is, on a quantal response which entails the counting of all-or-nothing events (deaths and survivals). That quantal methods are statistically inferior to those which use a continuous variate is recognised by statisticians (Emmens 1948c). It is technically preferable, therefore, to use wherever possible a continuous variate such as body temperature, a reaction-time, the weight of body or organs, the pulse-rate, or an analysis of blood or urine, rather than a discontinuous variate such as a count of deaths and survivals; and meanwhile, from a humane point of view, it is desirable to avoid using death as the end-point if some pleasanter technique can be found. One cannot help wondering how far the extensive use of the 50%-survival test is a hangover due to habit and custom, and whether suitable continuous variates have been sought as diligently as could be desired. Even for testing toxicity with an L.D. 50, death might not be the only possible end-point that could be chosen if the phenomena of the moribund state were to be adequately analysed.

(2) At what level of precision should an assay be made? A drug will usually be assayed with a view to its use in clinical practice, and in clinical practice the response to a given dose varies greatly from patient to patient. While a few glasses of port may put the parson under the table, his friend the squire may be a three-bottle man. In other words, the clinical response to a drug may be expected to vary very widely between patients. Is there any point in assaying batches of pharmaceutical products with a precision high enough to be swamped by the variance of the clinical response which will be found in practice when the product is put to the uses for which it has been manufactured?

Let the prescribed dose of a given drug be P; let the optimum dose for a given patient be D; and let the dose actually given be G. The error in the dose given is (D–G), the error in the prescription—i.e., the deviation of the prescribed dose from the dose which would be optimal for that particular patient—is (D–P), and the error in the assay is (P–G). Now

$$\mathrm{var}(D-G)=\mathrm{var}(D-P)+\mathrm{var}(P-G);$$

thus if the response varies greatly from patient to patient, so that var(D–P) is large, any minute precision in the assay, making var(P–G) small, will be swamped by the variance of the patient's response, and no advantage to the patient will accrue from it. For example, if the standard error of the prescription is 10 mg. and that of the assay is 1 mg., doubling the error of the assay will increase the error of the dose given by only 1½%.

The question arises, therefore, whether some of the standards laid down by regulation under the Therapeutic Substances Act are not unrealistic; whether, in fact, a proportion of the animals used in that connection are not wasted.

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The Wider World

THE NEW CHINA

T. F. Fox
M.A., M.D. Cantab, F.R.C.P.

(*concluded from p. 999.*)

The Mother

In some ways, of course, the Chinese are giving a lead. In one of the districts of Peking, antenatal care is taken so seriously that they are hoping to send visitors to every home four times a year to ask whether anyone is pregnant.

In that district, as in Shanghai, about 60% of births take place in hospital, where the mothers usually stay five days. Antenatal examinations (5–7 of them) are done at one of half a dozen maternity substations, each staffed by a semi-private group of midwives working for fees. Women generally prefer to go to hospital, because homes are congested and (as in England) the formerly helpful sisters and aunts have gone out to work; but special care is given, if need be, to those who cannot have hospital beds, and the midwife pays routine visits 2, 4, 8, and 12 days after delivery. For the premature, an incubator with hot bottle is sent from the substation, and infants of as little as 1·5 kg. have been reared. To cover the care of prematures and other unexpected expenses, the Government gives 50 dollars a month to the district maternity station for distribution to the midwives' groups. This district station, with its medical staff, supervises the maternity and child-welfare services of the district, whose 340,000 inhabitants produce 11,000 babies per annum.

Before Liberation, midwifery in China was largely undertaken by handywomen, with results that often included tetanus neonatorum because the umbilical cord was cut with unsterilised scissors or because bleeding was stopped with dirt. In a Peking district in 1949 a third of the births were still attended by untrained women; but since that time both voluntary and official bodies have concentrated on raising standards throughout the land, and in the cities almost everybody who delivers babies has now had some sort of training.

The results, as reported to us, are certainly remarkable. In the Peking district we visited, tetanus neonatorum has been abolished, and, though pregnancy toxæmia and postpartum hæmorrhage still cause concern, there has been no fatal puerperal sepsis since 1954. Maternal mortality in 1956 was said to be only 0·3 per 1000 live births in this district and 0·28 in Shanghai—reduced respectively from 2·0 in 1949 and 2·8 in 1951. The rate for England Wales in 1955 (excluding abortions) was 0·54.

The Child

In the greater part of China, where most people live and die under the care of traditional doctors, vital statistics can be only sketchy; but more accuracy is attainable in the big cities, and in Peking the authorities are confident that all births and deaths are notified. Before Liberation two-thirds of the deaths were uncertified, but nowadays 80% are certified medically, and in the other cases a health worker visits the relatives and makes an informed guess. Infant mortality is said to have fallen in Peking from 117 per 1000 births in 1949 to about 37 in 1956. In one of the districts the figure was given as 44; but in a small area, where work has been intensive, it had come down to 22. The Shanghai figures were 40 in 1951 and 31 in 1956—not so much higher than the English figure of about 25.

Infectious Diseases

In cities the immunisation programme is elaborate. In Peking 90–97% of the infants get B.C.G. at 10 to 12 days: the midwives inject it, but some hospitals are giving it, experimentally, by mouth. At 2 to 6 months the infant is vaccinated against smallpox: this is not exactly compulsory, "but usually we don't get people who refuse"—though nothing would happen to them if they did. Later the child is immunised against whooping-cough (at 6 months to 2 years), diphtheria (at 2 to 8 years), and commonly against epidemic encephalitis (Japanese B).

Unlike spring-summer encephalitis, which was described in the North-East as no longer a problem, Japanese B (transmitted usually by a culex mosquito) still causes uncomfortably many cases, and their mortality-rate was nearly 20% last year. In a Peking district 80% of children under 10 were getting the vaccine, and so were many in Shenyang; but, though it is said to give "perhaps 1 in 3 or 4 protection," opinions are divided on how far it is innocuous. It is made from infected mouse brain inactivated with formalin.

All this effort is having its effect. The attack-rate from diphtheria, for example, has come down in Peking from 15·5 per 100,000 in 1951 to 1·4 last year—though in Shanghai it was still 8·7. Measles, which in Peking as in London appears in two-yearly waves, had a fatality-rate of 0·4% in 1956 against 2·7% in 1953. 0·4%, however, is still rather high, and measles continues to cause anxiety. In the North-East one reason suggested for the disturbing frequency of deaths from measles pneumonia was too general use of chloramphemicol by the doctors who first see the child. This might alter the normal lung flora and give pathogens a freer field.

Nutrition

Children of very poor parents may get free milk; but, as in Russia, vitamins and foods are not generally distributed. At the children's hospital in Peking it was said that 20% of children had radiological evidence of rickets, and at least one of our party came to the conclusion that protein deficiency is far from uncommon and is an unrecognised or underestimated factor in the illness of many children.

Two of us discussed nutrition at a Peking child-health centre which, as an administrative experiment, has been separated from the district maternity centre and now confines its attention to children—60,000 of them under 7 years old. Its first step, in 1952, was to organise medical inspection of the children, and 80% were examined, especially for trachoma (still troublesome), skin diseases, intestinal diseases, and malnutrition. At that time 17% were regarded as malnourished; and some still are. But the reason, the director believes, is not so much lack of money as failure of intelligent feeding: cabbage juice contains vitamin C, and delay in weaning, she thinks, is quite unnecessary when soya bean is cheap. (Also cheap is the shark-liver oil which could prevent rickets.) Living standards are rising, the director said, and the main need is to give the families knowledge.

Supervision

From this centre, a public-health nurse goes to every home where a child is born, and she continues to visit if necessary. Mothers are told to take their children to an ordinary clinic (primary care) four times in the first year, and again at 1½ and 2. After that the children come to the child-health centre itself.

The centre supervises 83 day-nurseries, for children under 3, and the local kindergartens for children from 3 to 7. Some of these nurseries and nursery schools are run by the district, others are financed by Government offices or factories, but many are private ventures; and they all have to be approved by the centre. Mothers who go to work may pay quite a lot (14–26 dollars a month) to have their child looked after during the day, and some children are there day and night—except presumably on the mother's day off. Opinions differ on whether nursery or home is best; but the director evidently did not regard the risk of infection as a serious objection to nurseries, provided feeding and management are good.

In primary schools in Peking the school physician, who inspects the children once a year, is usually a member of a private group practice. In secondary schools he is a Government doctor. At school, much stress is laid on healthy habits

such as washing before meals and cleaning the teeth twice a day.

In the Factory

Whether good or bad for children, day nurseries and nursery schools are part of the picture of an industrial civilisation where women take jobs. China is developing such a civilisation, in which even young mothers are encouraged to work in offices and factories. Fifty-six days off on full pay, and some extra help if need be from the trade union, are granted to women who have a baby; and in large undertakings there will probably be a crêche where the child can be breast-fed a couple of times a day during working hours. At the two biggest concerns we visited, women formed 11% and 15% of the employees.

There are, of course, all grades of factory—at one end some little workshop unchanged for a thousand years, and at the other the huge automobile works at Changchun, built, like so much else, to Soviet designs with Soviet help and Soviet machinery, but now carried on by the Chinese themselves.[24]

Here the workers are mostly young; it is a "youth factory"; and, if the labour is arduous and monotonous (with only Sundays and the half-dozen annual "bank holidays" free), the skilled man has his reward as he sees the 4-ton "Liberation" lorries drive off the assembly line—though, so far, their number has been only a fifth of the 30,000 a year the plant should make. Here, too, are the accompaniments of modern industry—the night schools for technical education, the clubs, the entertainments, and the new (if rather dreary) housing estate, already holding 80% of the workers, with its central heating, its gas-rings, its bath-houses, its allotments, its shops, and its banks. No doubt most of the participants rejoice in this latest development of what the Japanese began when they decided to make Manchuria one of the great industrial areas of the world.

At the lathe factory at Shenyang, first built by the Japanese, we heard not only Western music-while-you-work but also something about welfare—about the bathrooms, the day nursery, the rest-homes to which doctors can send people who are run down but not ill, and the night sanatorium, on the Russian model, where a man, still working, can for a time have more amenities and relaxation than his home can offer.

Workers are absent on the average only about two days a year, and those who are ill get sick-pay for six months—60% of their wages if they are newcomers but 100% if they have been eight years in the factory. On retirement at 60, they draw 70% of their wages, for the rest of their life, even if they take another job; but, provided they are still healthy and willing, they are encouraged to stay on, receiving *higher* pay and easier work, perhaps supervisory. ("He's a good chap, and he deserves a reward.")

In the automobile factory one technician was getting 170 dollars a month (about £25), of which, despite six children, he and his wife saved 40. (As in Britain, he can put these savings into Government lottery bonds; and in Manchuria, despite his wireless set and his goldfish, he has even more need of this excitement than he would have in Manchester.) In the lathe factory the average wage is 73 dollars a month, though there are incentives for extra production or for helpful inventions. But in talking about the level of wages one must remember that wage-earners and trade-unionists are still only a minute proportion of the Chinese population. And even if, by our standards of living, they do not earn very much, they are, with their privileges, far better off, in money, than the masses on the land—still over 85% of the nation.

24. Russian technicians were formerly very numerous in China; but today, in our interpreters' somewhat ambiguous phrase, there are not "too many." In Peking the huge blocks of apartments built for them are being gradually vacated. In other parts of the country, however, the Russians are still helping, very actively, to lay new foundations for China. Soviet aid has been enormous, and seems to have been generous.

The Land

In China, as elsewhere, country people have the great advantage of being out of range of the loud-speakers which so often assault the ear, if not the soul, in factories. Indeed, at first sight, life on the land may seem to be going on as it has done since time immemorial. Nevertheless great changes have begun.

According to the Communists, no change at all was possible so long as so many farmers remained in the power of parasitic landlords, who not only charged exorbitant rents but immediately raised the rent of anyone who managed to increase his output. This grip of the landlords on the countryside, strengthened by usury, could not, they say, be broken except by force; and the redistribution of property was, as everybody knows, accomplished in years of terror, with meetings of denunciation, and often bloodshed. Since, to the Communist, this was an unavoidable means to the necessary revolution, he tries to justify the liquidation of reactionary landlords in the same way as we in Europe have sometimes justified the liquidation of our particular nation's enemies.

After the land had been divided in small amounts among the farmers and peasants, the Government sought to rationalise their work by inducing them to join forces with one another. In the first type of cooperative the farmer remained owner of his land but rented it to the cooperative, which bought implements and paid him for his labour. In the second type, which has now been generally imposed, the farmer gives up his land to the cooperative, which owns all the tools and pays him a share of the proceeds according to how much he does.

The Red Light Cooperative, near Changchun, comprises 28 families with 138 people, and farms 45 acres. They grow one crop of rice, and the families make rope from the stalks. Everyone over 16 is a working member, paid on a points system, and a management committee of five, including the chairman, is elected by the members. Normally about 10% of the rice crop goes to the Government as a tax; some is kept for food; and the rest is sold through a Government collecting-station. The Government has given two loans, since repaid; the cooperative now owns a little stock of machinery, and has some money in the bank, including a welfare fund; and the families are considerably more prosperous than before, with an average income estimated at 750 dollars last year. Some who formerly lived in penury, and often half-starved, have been able to buy a clock or a bicycle, or (first priority) a sewing-machine. They can have a plot of their own for chickens, goats, and vegetables.

This was a cooperative where things have gone well; and perhaps its members got more help because they were Koreans, not Chinese; for, in the new China, racial minority groups are specially favoured. According to a *Times* correspondent,[25] the annual income of the average peasant is only a tenth of what these people were earning, and the condition of perhaps a quarter has not been improved by Liberation. But, in the neighbourhood of cities at any rate, farmers appear less poor than formerly: they and their families are better clad, and they can now afford cigarettes. Some improvement might have been expected simply because the land is at last at peace—because, almost for the first time in people's memory, the armies of war-lords and revolution and invader have ceased their trampling. But cooperative working of the farms should also have raised efficiency—unless, as some observers believe, it has been hurried too much. In revolutions the eternal problem of Governments is to get the peasants to go on producing food, and go on selling it through the proper channels. There are rumours that, in China today, quite a lot of the men who are managing cooperatives feel more loyalty to their own members than to the Government, and are consequently selling their produce, at higher prices, on a black market.

Whatever its organisation, any Chinese Government—especially if engaged in industrialisation—is vulnerable

25. *Times*, Oct. 2, 1957, p. 11.

to agricultural disaster; and until the great rivers are finally tamed by the dams and sluices now being energetically built, the risk of such disaster must remain greater than in other countries. Moreover, to feed a growing population, food production must steeply increase; and this again is trickier in China than elsewhere.

A great deal of Chinese farming is what we should call market-gardening, with the crops in small plots fastidiously weeded by hand. Looking down from the air north of Peking, one sees, as far as the eye can reach, a vast plain dotted with little villages looking like equidistant nævi—each village with perhaps some 20–40 houses, and each less than a mile from the next. The people here are living, year in year out, on the proceeds of as little as a third of an acre per head. Yet clearly the output of their land would not be increased merely by sending in tractors; and mechanisation of agriculture in a Western manner would do no more than throw half these villagers out of work. Probably many of them are already underemployed.

How then can China's food supply be increased by modern methods? Partly, we were told, by improving the crops, with better seed and fertilisers, and by selecting strains so as to space their ripening-times. But secondly, and more important, by creating mechanised State farms in the land at present virgin. Travelling, as we did, through thousands of miles of intensive cultivation in the seaboard provinces—rice, millets, groundnuts, soya bean, sweet potato, cotton, tobacco, sunflower, bamboo, willow, and mulberry—it was hard to believe that such virgin land exists. But its area is said to be as great as that now farmed; and, if it can in fact be used, China should be able to go on feeding her people, from her own resources, until their number can be stabilised.

Population and Birth-control

A big effort is being made to popularise contraception. In a Peking park the Institute of Health Propaganda had a birth-control exhibition, with explicit models, which had been visited by 400,000 in six months. Equally explicit posters in the streets were being studied by passers-by; and the cost of contraceptives has been brought within most people's means. It was interesting, however, that nobody admitted that this campaign was actuated by anxiety over food: the reasons given to the people are that too frequent childbearing is bad for health, that women are needed for work, and that a well-balanced emancipated life is impossible if one is always having babies. These lessons are put over in hospitals and clinics by the Women's Federation.

So far, however, this campaign does not seem to have had much effect, even in the cities. At a district maternity clinic in Peking only 20 women come each month for the contraceptive instruction offered them; and the birth-rate in Shanghai, which was 43·8 per 1000 in 1951, had fallen only to 40·3 last year. The death-rate having also fallen—remarkably—from 19·4 to 6·7 in the same period, the population has been increasing briskly. But, as the health authorities remarked, it takes time to make people understand that birth-control is even a possibility.

Abortion may be induced only on medical grounds, and the indications are still under discussion. Permanent sterilisation may be performed if both parties to the marriage ask to have it done. In Shanghai the fallopian tubes have been tied more often than the vas deferens.

Housing

The birth-rate may come down as the standard of living rises and people are decently rehoused. But Chinese cities are as appallingly overcrowded as our own a century ago. One street will have modern public buildings while the next will be lined with tiny poky shops, one or two rooms deep, in whose dark recesses whole families live and sleep. Rehousing, though constantly in progress, has to contend with a steady influx of people from the countryside; and, inevitably perhaps, the new houses have taken the form of tenements filled so full that they too resemble slums—though relatively healthy ones, with showers and lavatories and less discomfort. If you want to see the comparable solution of this problem under British rule, go to Hong Kong, where some of the people live at a density of 1400 to the acre, and where the new tenements for Chinese refugees, though better built, are even more startling than anything new we saw in China.

The most promising essay in rehousing of the city population was an estate outside Shanghai, where the apartment blocks are not very large, and where a new suburb or neighbourhood is being erected for the 4000 families it contains. Public telephones and bus services have been laid on; there are four vegetable markets and four points at which people can collect boiling water; and a workers' club has been built, with libraries to follow. Best of all, there are 18 gardens, and 20,000 trees have been planted.

Though this is the New China, it is also an ancient country of lovely architecture, whose landscape gardening has inspired much of our own; and these arts, though perhaps a little stupefied, are not dead. In tenements and Government buildings alike, one sees an attempt—usually more successful than the Russian—to produce new buildings which at least recall the style of the country, being modern yet still Chinese.

As for the old and beautiful, it has been reverently preserved, and is sometimes being reproduced: the gardens of the Imperial City can have been little lovelier in the Emperors' day, and Tientsin has a new park with lake and willows on the happily familiar pattern. At Hangchow, whose holiday charms we must hope that West as well as East will some day enjoy, trees and shrubs were being planted, on the millennial causeways and artificial islands, with solicitude and skill enough to win the heart of any gardener.

In the New China

Of the other arts, the theatre seems to flourish, at any rate in its classical form. To the current version of some traditional opera or ballet the youthful audience may return again and again—perhaps because it gives them something they have missed. Themselves schooled in frankness, and wearing plain white shirts or blouses, they are evidently fascinated by the stylised intricacies and embroidered elegance of the past—the complex formalities of gesture, the lovely clothes, and even the romantic ending.

Indeed, like the rest of us, they may look to fiction, now including films, for guidance on how to conduct their private lives. Liberation has gone far to liberate them from the Family [26] and, though even the Party will never quite abolish dominating parents, there is already an immense difference from the days, not long ago, when a young man might see his bride for the first time after he had married her. "After two thousand years of tyranny," says de Segonzac,[27] "the lovers of China are free to make their own choice. But as yet they don't quite know how to use this brand-new freedom. They have absolutely no idea of courtship or of wooing." And, one may add, they are lucky if they ever find any privacy for it. Against this, they are able to marry earlier, because men no longer have to save money beforehand.

Seen in the mass, in cities, the young Chinese, like the young Russians, look animated and confident. The ardour with which they have taken to physical training is apparent alike on the bathing beaches of the Summer

26. Tradition of course lingers. For example, the Party has not made much progress yet with cremation, which would prevent waste of substantial amounts of useful land; and, despite its deprecation of expensive funerals, we heard of a car-driver who had just spent 2–3 months' wages on burying his father.

27. de Segonzac, A. Visa for Peking; p. 59. London, 1956.

Palace, in the strenuous netball played in little courts between houses, and in the exercises practised even in the street, sometimes under broadcast instruction. One of our interpreters always ran 1000 metres (or was it 3000 ?) before breakfast.

BROTHERHOOD AND NATIONALISM

As for moral training, it never ceases; and if some of us imagine that Communist indoctrination produces only bigots and sheep, we should note that much of it resembles, and indeed has the same roots as, our own religious teaching. These young people, like our own, are taught to "do as you would be done by" and to help others in trouble. But unfortunately, more even perhaps than in the West, there is a tendency to feel that these duties apply to one's own group rather than to mankind as a whole. For whereas the best Occidental doctrine accepts neither class, colour, nor creed as a barrier between man and man, the Communists insist that class, until it is abolished, remains an obstacle. Thus in 1942 Mao Tse-Tung, speaking on the need to hate what is detestable, discouraged, for our time at least, the very thought of human brotherhood:

"Since the division of humanity into classes," he said, "the so-called 'love of humanity,' an all-embracing love without distinction, has never existed. It is a thing that has been repeated in words by the rulers, by Confucius, by Tolstoi, but has never been realised in fact, for the simple reason that it cannot be realised in a society which is divided into classes. True love of humanity is possible but it will only be attained once class distinction has completely disappeared from the world." [28]

Whereas to Western ears these formidable words exaggerate the significance of the class struggle, to Communists the division between haves and have-nots has seemed fundamental. But it does not follow that their theoretical disbelief in the present brotherhood of man will lead them to make war, any more than our theoretical belief in it has led us to make peace. Nor is the revival of nationalism in China necessarily more than an expression of Mao Tse-Tung's famous declaration: "From today the Chinese, who form a quarter of humanity, are on their feet." [29] Nationalism in some degree was an unavoidable reaction to what they have suffered from outsiders for a century and more; [30] and if at present this reaction sometimes takes the form of military displays, and posters demanding the return of Formosa, who are we to judge ?

When he describes war as "monstrous fratricidal murder," Mao may well be as sincere as his Western counterparts when they say the same thing; and, in what was once, above all, a nation of scholars, even Picasso's dove—painted on every little ship—could possibly be a genuine emblem of hope.

SELF-RESPECT AND AUTHORITY

On the everyday level, the reforming zeal has worked a wonder. Though the Chinese have often been praised for honesty, it is no small thing that the ignorant foreigner, wandering round the shops, need no longer try to count his change. Shopping is much easier, if less exciting, now that the price of everything is clearly marked, and much the same wherever one buys it. [31] Nobody touts for custom or presses the customer, just as hardly anybody begs. In a month, one small girl asked us for money; and another, who followed us round a shop rather excitedly, seemed to be doing so; but in fact she was trying to tell us, rather officiously, that we ought not to be buying cloth without coupons. On this she was wrong, for only cotton cloth needs a coupon—the other rationed goods in China being grain, pork, and oil. The present rations are said to be ample, though some observers seem dubious about their remaining so.

The punctiliousness of people in hotels and elsewhere, who take equal trouble to return a 10-cent piece, or one's discarded pants, or the tip that some newcomer has rashly attempted, is attributed by cynics to the knowledge that anybody found defrauding one of "our foreign friends" will go to prison for quite a long time. That may be partly true; but this slightly obtrusive honesty is, I should think, mainly due to a change of public opinion and a growth of self-respect. I do not know how far the ordinary citizen is affected by thoughts of the police; but in China the foreigner is not conscious, as sometimes elsewhere, of living in a police State. Indeed, an attempt has been made to produce policemen who are part of the People, rather than their enemies—an attempt exemplified by the rule that, when a policeman on traffic duty makes a mistake at the expense of a driver, he must go up to that driver, salute him, and apologise.

No, this is a different kind of State, in which control is less official and less obvious. The medical visitor, intent on talk with his Chinese colleague, may hardly notice anything unusual in his environment; but the evidence is there for eye and ear. The invariable pictures on the walls, the red banners, the notices, and the posters; and, over and over again, the formula saying that the work has been possible only through the leadership of the Communist Party and the cooperation of the People. Often true, no doubt; but sometimes I sensed an undertone of fear.

Whether, and to what extent, such fear will remain part of the life of China, time alone can show: the regime is only eight years old. But the history of the past year is, I think, consistent with the hypothesis that those who lead this great country are fully aware that, once the crisis of creation is past, means must be found to develop the freedom of thought and expression without which, in the end, there can be no stability and no progress towards a really better civilisation. What is all too evident is that opposition to such changes may be expected from most of the loyal, enthusiastic, but less-intelligent people on whom the leaders depend. Such people, authoritarian in behaviour and dogmatic in beliefs, exist in all countries; but to the outsider it seems that in societies advancing towards Communism they have unusual opportunities both for exercising power over their fellows and for obstructing any modification of the system in which they thrive.

Be that as it may, there is one characteristic of the Chinese leaders which is definitely attractive—their readiness to admit mistakes. Indeed, at all levels people said "there are many defects in our work"; and in the hope of useful comment our guides at least once took us to what they called "a black spot." This modesty, both towards shortcomings and towards great success, is no more than a manifestation of the national manners—a civilised achievement it would be impertinent to praise. When they recognise their common fallibility, East and West can stand on common ground.

28. Roy, C. Into China; p. 369. London, 1955.
29. *Ibid.* p. 25.
30. See Latourette, K. S. A History of Modern China. Penguin Books, 1954.

31. The big department stores of cities have a remarkably wide range, from mass-produced goods to those of high quality and craftsmanship. Next to the cheap and not-very-nice, one may find rolls and rolls of splendid brocade. (The Russians do not have such things at home. Nor, indeed, do we—except latterly from China). Outside the store, one can join the rapt circle round a man sitting on the pavement who is demonstrating his remedies against snakebite. He has a certificate, a lot of little bottles, and a bag containing two large if rather somnolent snakes, which he releases impressively from time to time. Some of the local ones are very dangerous; but people earn a living by collecting them for food, and there is a soup (which unfortunately did not come our way) called Five Deadly Snakes. I am determined, however, not to be drawn into a description of Chinese food and cookery—one of the arts which has happily not been lost.

Common Ground

I have failed entirely unless I have shown how big the common ground already is in medicine. In Britain and in China we are trying to do the same things, often by the same methods. On a hot summer's day in Peking, the surgeon, in gown and mask, uses a black fan as he ponders our question; but, even through an interpreter, he speaks the same language as ourselves.

The Chinese medical scene is at once less and more interesting than the Russian. Less, because it has not yet developed individual characteristics like those of Soviet medical organisation—the free service, the separate policlinics for adults and children, the periodic health examinations, and the huge network of sanatoria and health resorts. More, because it is a meeting-point for three medical worlds—the traditional, the Anglo-Saxon, and the Russian. Compared with Soviet doctors, the Chinese are, for historical reasons, more alive to American and English work in medicine, and, though they have their own journals—fifteen special journals in Chinese and the *Chinese Medical Journal* published both in Chinese and in excellent English—their many libraries are remarkably well supplied with books and periodicals from afar.

But this, of course, is not enough. Though many of the seniors have worked abroad and are mentally in contact with what the rest of us are doing, very few of the younger ones have done so. And here I would endorse, with all the emphasis at my command, the conclusions reached by Professor Spooner from his more particular study of current bacteriological research:

"The present senior generation are handing on their knowledge, methods, and training to younger men as well as they can; and their pupils, as they in turn become senior, will be technically and intellectually as well equipped as their present teachers; but the West itself has moved on in these years, and the younger men, as they grow up to seniority, will lack the advantage of having seen from their own personal experience what the West is, what it is striving for, and what it has to offer China."

"The chief risk as I see it, is not that lack of contact will deprive the Chinese bacteriologists of technical 'know-how,' for most of this they can acquire by their own efforts and from Western literature. The real peril is, that, not having seen for themselves the oncoming senior generation will not know what it does not know, will be unsure of its standing vis-a-vis Western medicine, and may react to this uncertainty by becoming increasingly insular."

"The strongest idea I have brought away from China is, that it is most important for medical science the world over that an exchange of students between China and the West should start again at the earliest possible moment, regardless of political difficulties."

If in this article I have laid stress on the political background of China, it is only because I think we should try to understand it. But, in the sight of history, national and ideological groupings have always been transient, whereas the medical community is founded on an idea that is certain to endure—because in fact mankind *is* one.

To any of us who merit Job's sardonic rebuke "No doubt but ye are the people, and wisdom shall die with you," a visit to 600-million China is a chastening experience. Any such distemper in my own mind has now, I hope, been finally dispelled. Indeed, I came to feel that if humour, ingenuity, kindness, and fortitude are the human qualities that need preservation, there is no reason to be much disturbed by the thought that the Earth might be ultimately inherited by the Chinese rather than ourselves.

I do not know how far my companions would agree with what I have written. In one thing, however, I can safely speak for them all—in thanking the Chinese Medical Association for its generous and considerate treatment of us. We recall with pleasure our meeting with Dr. Fu Lien-Chang, the president, at the Summer Palace where he was recuperating from illness, and the beatific presence on so many occasions of Dr. Fang Shih-Shan, vice-president. For myself, I must particularly thank Dr. Chung Huei-Lan, physician to the Sino-Soviet Friendship Hospital and editor of the *Chinese Medical Journal*, who made so many of our arrangements, Prof. Ho Kwan-Ching, Prof. Cha Liang-Chung, and Dr. Wang Hsi-Meng. The short-list of others who welcomed us and helped us—often, I fancy, at considerable inconvenience to themselves—has forty names at least; and I cannot mention them individually. But we certainly shall not forget the always perspicacious hospitality we had from our new friends in the New China.

Special Articles

THE WILLINK REPORT

Number of Doctors and Students

IN February, 1955, the Minister of Health and the Secretary of State for Scotland appointed a committee, with Sir Henry Willink, Q.C., as chairman,[1] to estimate the number of medical practitioners likely to be engaged in all branches of the profession in the future, and the consequential intake of medical students required. Their report appears this week.[2]

With an estimated number of 53,260 active doctors of both sexes in practice in Great Britain in 1955, the amount of unemployment is described as very small: in any profession there are some qualified persons who for one reason or another have difficulty in finding employment, but the "hard core" of unemployed doctors appears to be insignificant.

As regards future openings, the committee do not expect anything like a mass exodus from practice in 1958 when doctors who entered the National Health Service in 1948 will qualify for pensions. The annual intake required for replacement purposes is calculated as:

1955–60	1150	1965–70	1230
1960–65	1180	1970–75	1260

This is for the whole population of doctors: the committee have not attempted speculations on a sectional basis.

EXPANSION OF OPPORTUNITY

Apart from replacement, the committee had to consider probable expansion. In so doing they decided not to make any allowance, one way or the other, for unpredictable changes in the incidence of disease, in methods of treatment, in the health of the community, or in the organisation of the health services. But they thought it possible to estimate existing deficiencies, and they collected information on many sorts of medical posts at present unfilled.

General Practice

The biggest existing deficiency, they reckon, is in general practice, where in July, 1955, there were 21,350 principals in the N.H.S. and about 650 doctors dealing solely or mainly with private patients. Between 1952 and 1955 the number of patients per doctor's list fell from 2436 to 2283 in England and Wales and from 2074 to 1975 in Scotland; but in England and Wales in 1955 the range was still between 2736 in designated (under-doctored) areas and 1554 in restricted areas, and "a problem of maldistribution thus remains". A "realistic estimate of likely expansion over the next few years would", they think, "be the number of additional principals required to reduce the average number of patients per list to 2500

1. The other members were Dr. J. T. BALDWIN, Sir HAROLD BOLDERO, F.R.C.P., Sir JOHN CHARLES, F.R.C.P., Lord COHEN of BIRKENHEAD, F.R.C.P., Sir ANDREW DAVIDSON, F.R.C.P.E., Dr. A. B. DAVIES, Mr. J. P. DODDS, Sir GEOFFREY JEFFERSON, F.R.C.S., F.R.S., Mr. L. G. K. STARKE, F.I.A., and Mr. A. B. TAYLOR, D.LITT., Mr. PHILIP MUSTON acted as secretary.
2. Report of the Committee to Consider the Future Numbers of Medical Practitioners and the Appropriate Intake of Medical Students. H.M. Stationery Office, 1957. Pp. 38. 2s. 6d.

in non-rural areas where the average at July 1955 was in excess of that number, and similarly to 2000 in rural areas". In July, 1955, about 625 additional principals were required to achieve these averages. Besides making good this deficiency, it will be necessary to add 75 to the total of general practitioners annually to compensate for the growth of population.

Hospital Staff

The committee see no reason to think that expansion of the hospital and specialist services is at an end. The population is increasing, and medical knowledge and practice are becoming "more elaborate, exhaustive, and time-consuming". They put the average annual increase in the number of specialists (consultant and S.H.M.O.) at 160, reduced to 80 after mid-1965.

At the middle of 1955 there were about 770 unfilled junior hospital posts, but "as time passes and the number of doctors available for all the competing demands is increased, these deficiencies will be made good". To keep an appropriate balance between senior and junior staff, the latter are likely to be increased also by 160 a year.

Total Civilian Requirements

Having examined the prospects of expansion in employment by local authorities, universities, industry, and Government Departments, the committee give the following estimates for civilian practice:

Total no. of additional doctors needed to meet deficiencies existing in 1955	780
Annual number of additional doctors needed to meet further likely expansion:	
1955–60	465 per annum
1960–65	440 „ „
1965–70	280 „ „

The number of doctors likely to be engaged in civilian practice in Great Britain by 1971 is about 60,000. The greater part of the increase is expected to occur before 1965, the number of doctors in that year being estimated at between 58,000 and 59,000.

CONTRACTION OF OPPORTUNITY

The Armed Forces

The three Service departments aim at increasing the number of permanent officers from about 1020 to about 1420 and estimate that subsequently an annual intake of about 55 will suffice. The number of short-service and National Service officers is to be reduced by the end of 1962 from about 1840 to about 380. Together these changes will reduce the number of doctors employed by the Armed Forces from 2860 to 1800.

The Net Export

The opportunity for doctors from Great Britain to obtain employment overseas has been diminishing and will continue to do so. The committee estimate that the present number of doctors from Great Britain who leave to settle and practise overseas (including medical missionaries) is just under 400 per annum. The present number of doctors from overseas, almost entirely from Northern Ireland, Eire, and Commonwealth countries, who settle and practise in this country is just over 200 per annum. There is thus a current net export of just under 200 doctors per annum. The committee think this will decline and give the figure as 160 in 1955–60, 110 in 1960–65, 70 in 1965–70, and 50 in 1970–71.

OUTPUT OF THE SCHOOLS

The output of all medical schools in Great Britain is about 1825 per annum (excluding students from overseas who return to their own countries to practise), with an estimated 30 more doctors from Northern Ireland, giving a total of 1855. During the period mid-1955 to mid-1962 inclusive, the number of new doctors beginning to practise in Great Britain, at an average of 1855 per annum, will have amounted to about 13,000; and these, together with 1060 doctors made available by reduction in the Armed Forces, will more than meet not only the committee's estimate of needs arising during that period but also their estimated deficiency of 780 in mid-1955.

On their calculations the average annual output required, from 1962 to 1971, from medical schools in Great Britain is 1655. With a wastage calculated at 6% the number of students entering preclinical work (i.e., after the 1st M.B.) should average about 1760. This would be a reduction of about 10% in the present intake.

About 100 Colonial undergraduate students are placed each year in medical schools in the British Isles. The Colonial Office expressed the view that if there were more places this figure could and should be increased by about 75. Since they all return to their own countries it could be increased without affecting the size of the profession in this country.

UNIVERSITY COLLEGE HOSPITAL, IBADAN

TEN years ago the University College was founded at Ibadan, in Nigeria; and soon there was clear need for a teaching hospital.[1] On Wednesday the new University College Hospital was to be ceremonially opened by the Princess Royal.

1. see *Lancet*, 1956, i, 628.

THE BUILDINGS

Building began in October, 1953, on a site of 187 acres two miles from the city of Ibadan and two miles from the college. Certain departments began to move in at the end of last year, and the first patients were admitted in April. By July half the wards (250 beds) and all essential departments were in use.

The main wings of the hospital have five floors, and the central block, which contains the X-ray and cardiographic departments and operating-theatres, rises to six and eight floors. Much of it is air-conditioned. The outpatient and casualty departments, in particular, are generously conceived.

Some wards contain 28 beds, with the service rooms all at the north end; others are divided into wards of 10 to 16 beds by a central suite of service rooms. All ward blocks are 120 feet wide and 11 feet high, and the interval between beds is 8 feet. Each ward has an outside corridor and a patients' verandah. Oxygen is piped to some beds in each ward.

Service arrangements (power, laundry, &c.) are designed to cope with 800 beds in case the hospital should expand.

Fig. 1—The main hospital building.

Fig. 2—The hospital main entrance block.

The total cost of the hospital was just under £5 million, which was found wholly by the Nigerian Government.

THE CONSULTANTS

During the period of building, the clinical staff have been working at the Government hospitals—mainly at the Adeoyo Hospital, in Ibadan—while the students passing the preclinical examination in the faculty of medicine have gone on to study at hospitals in Britain. The physicians and surgeons working at the Government hospitals have gained much experience of African medicine, recruited new teachers, and done useful work in hard and overcrowded conditions. They have had help and advice from teaching consultants and administrators from Britain.

The new hospital has special responsibilities. In Ibadan, a population of 600,000 is served by only a dozen general practitioners and not more than 350 beds in the Government hospitals, without special provision for tuberculosis, children, venereal diseases, or eyes; and the new hospital must rely on its own resources to cover all branches of medicine. Moreover, it will have consultant responsibilities to the whole Federation, including the Eastern and Northern Regions.

THE STUDENTS, NURSES, AND RESIDENTS

The senate of the University of London is understood to have granted provisional recognition to the Ibadan school for clinical training, and 32 students were to begin clinical work last month. There are now plenty of applicants for medical training, and the intake is intended to increase. In the hospital area are a hall of residence for 60 students, 126 flats, and 39 houses, and a home for 200 nurses. Further housing for 90 students and 180 nurses will be completed in a month or two. The resident doctors are now living in a hostel but will later be separately accommodated.

The school of nursing was opened in 1952, and was recognised in 1954 by the General Nursing Council as suitable for training for the S.R.N. certificate. 82 students have been trained, 150 are in training, and an intake of 80 is expected next year. The target is 320 in training. Their newly built school is on the hospital site.

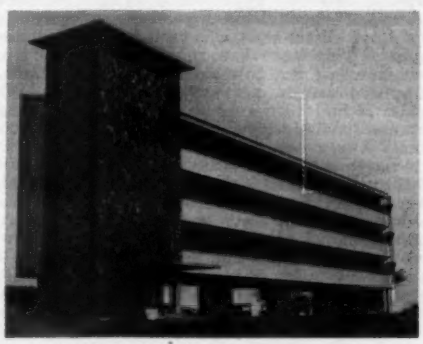


Fig. 3—A block of flatlets for nurses.

THE PATIENTS

Already many patients flock to the hospital daily from Ibadan and other parts of Nigeria; they are filtered through the hospital's "department of general practice" which, after rough clinical screening, rejects some patients, selects some for admission or outpatient investigation and treatment, and deals with others itself. Without such a screen it would be impossible to maintain good clinical and teaching standards; and the resident doctors who work there gain experience in treating large numbers of patients, as they would away from hospital. Not more than 5% of the patients seen at clinics or admitted to the wards are referred with doctors' letters. About a third of the patients attending are children under 10. The variety of African languages and the lack of skilled interpreters cause difficulties.

Nigeria, the largest British Colony, is now moving towards independence. Its population of over 30 million is served by only about 500 doctors. This fine new teaching hospital has great opportunities and responsibilities.

COLLEGE OF GENERAL PRACTITIONERS

THE fifth annual meeting was held on Nov. 16 in London, under the presidency of Dr. I. D. GRANT.

REPORT ON THE YEAR

Dr. F. M. ROSE, chairman of council, said that more than seven hundred new members and associates had been enrolled in the past year, making the total membership over 4500. Three new overseas faculties had been founded—in Victoria (Melbourne), in Tasmania (Hobart), and in New Zealand (Wellington)—making thirty-five faculties in all, thirteen of them overseas.

A council of the College in New Zealand had been formed to coordinate the work of the faculties there, as the Australian council had done so successfully with the five faculties in that country. With 610 members and associates in Australia the time was approaching for the foundation of an autonomous Australian College of General Practitioners.

Under Dr. Richard Scott's direction an undergraduate teaching register had been compiled of 1400 members of the College who were willing to take medical students into their practices. The work of the research committee of council (Dr. R. J. F. H. Pinsent, chairman) had increased in scope and complexity. The research register now included more than 550 general practitioners. Forty-seven faculty-sponsored research projects were being undertaken, together with seven College-sponsored investigations which included the national morbidity survey (in cooperation with the General Register Office), the coding and checking of the material for which had been completed. The *Research Newsletter* had outgrown its original form, and by the breadth and variety of its contents was becoming the journal of the College. A College records unit was being developed. The practice equipment and premises committee of council (Dr. J. C. T. Sanctuary, chairman) had begun its work.

Plans for the proposed new building in Lincoln's Inn Fields were progressing satisfactorily. Temporary premises had been presented to the College at 41, Cadogan Gardens, Sloane Square, London, S.W.3.

ELECTIONS AND PRESENTATIONS

Dr. Grant was unanimously elected president for 1957–58. Dr. W. N. Pickles received a past-president's gold badge. Dr. A. Fraser-Darling (Grantham, Lincs) was awarded the Butterworth gold medal for 1956–57 for an essay on the Science and Art of Prognosis in General Practice. The subject for the 1957–58 Butterworth gold medal and award will be Second Opinions; essays should

be submitted to the chairman of the awards committee by Sept. 20, 1958.

The following faculty representatives were appointed to the fifth College council (1957–58):

L. W. Batten (North London faculty), H. H. A. Elder (South London), E. A. W. Marien (East London), R. Cove-Smith (West London), George Swift (South-East England), J. C. T. Sanctuary (Northern Home Counties), W. G. Tait (Thames Valley), D. Scott Napier (East Anglia), R. M. S. McConaghey (South-West England), D. L. Crombie (Midland), K. M. Foster (North Midlands), R. A. Murray Scott (Yorkshire), S. Freeman (North-West England), R. Harkness (North-East England), R. J. Minnitt (Merseyside and North Wales), J. N. M. Parry (Welsh faculty), Richard Scott (South-East Scotland), W. S. Gardner (West of Scotland), J. M. Henderson (East Scotland), George Swapp (North-East Scotland), G. H. Clement (North Scotland), J. Campbell Young (Northern Ireland), V. G. Doyle (East of Ireland), J. P. J. Little (West Ireland), J. C. Walsh (South Ireland), W. A. Conolly (New South Wales), W. J. Hamilton (Queensland), H. E. H. Ferguson (Western Australia), G. D. McDonald (Victoria), the hon. R. J. D. Turnbull (Tasmania), A. Barrett Jameson (Auckland), C. L. E. L. Sheppard (Canterbury), H. E. M. Williams (Otago), L. Myers (Wellington), G. E. Peters (Kenya).

Four elected members of council, to replace those retiring, were appointed by ballot: Annis C. Gillie (West London), W. V. Howells (Welsh faculty), J. H. Hunt (South London), A. Talbot Rogers (South-East England).

At a meeting of the fifth College council held later, Dr. F. M. Rose was appointed chairman, Dr. Annis Gillie vice-chairman, Dr. H. L. Glyn Hughes hon. treasurer, and Dr. J. H. Hunt hon. secretary. Dr. J. M. Hunter (Northern Ireland) was appointed an additional member of council.

BIENNIAL DINNER

At the biennial dinner, on Nov. 15, Prof. ROBERT PLATT, F.R.C.P., declared that the renaissance of general practice was likely to prove one of the most important developments in the next ten to twenty years. Compared with the position thirty years ago, medicine in hospital and in general practice had clearly diverged. General practitioners were developing their own techniques, and it must be conceded that teachers in hospitals were no longer preparing students for work as family doctors. At present there were interim schemes for seconding students to practices; and gradually the College must establish an élite of general practitioners. The College was right to go slowly about its task. Professor Platt pointed to the danger of making the National Health Service a scapegoat for all that was wrong in general practice. He was responding for The Guests to a toast proposed by Dr. H. L. GLYN HUGHES, who spoke of the College's strong position. Many, he said, were surprised at its interest in research. This cost much but was well worth while. The College was particularly grateful for the support of the Nuffield Foundation. Dr. GEORGE GODBER, proposing The College, said that the general practitioner was the one person who saw the patient whole against his family background. He should have the scientific aids he needed from the hospital and also the help he needed outside hospital. The PRESIDENT, in response, remarked that so far the College had no examination; but members had to meet stringent requirements. The rehabilitation of general practice had been the aim in founding the College, which had been an act of faith: "We want only to be better doctors." In the five years of its existence greater progress had been made than could have been foreseen. Referring to those who worked for the College, the President spoke with special warmth of the unremitting efforts of Dr. John Hunt, the hon. secretary.

A TROPICAL JUBILEE

AT the golden jubilee banquet of the Royal Society of Tropical Medicine and Hygiene, held in London on Nov. 12, Prince Philip, Duke of Edinburgh, spoke of the story so often repeated in tropical medicine—perseverance, setbacks, cure, prevention. Having visited many parts of the world, he realised how many diseases he might have contracted but for the work of the society; and his admiration for explorers and doctors grew as he reflected on the behaviour of the large and fearless flies, the great big what-do-you-call-him, the snails, and the lice. The control of disease, however, created other problems, not necessarily medical; and it was no good saying that one's intentions were good and leaving someone else to clear up the mess. He hoped the same ability would go into these problems as into those already solved, and he felt that tropical medicine should direct itself increasingly to the needs of the community.

Brigadier J. S. K. BOYD, the president, said that the society was very proud of its cosmopolitan character: thanks to the cooperation of secretaries scattered throughout the world, it had some 2000 fellows, and in the headquarters at Manson House a spirit of comradeship and good will was very evident. To any who might think that no worlds are left to conquer, he replied that nothing could be farther from the truth. The society and its fellows would have as much to do in the years ahead as in those past, and his successor at the hundredth anniversary banquet would have as many triumphs to recount.

Sir PHILIP MANSON-BAHR, proposing The Guests, spoke of medical work in countries formerly under British rule: how much better, he said, to sow the seeds of health than the seeds of hate. Sir HENRY DALE, responding, remarked that the sharing of experience is a more natural function of medicine than of other activities: in tropical medicine, for example, unrestricted international cooperation is an essential condition for effective research.

Parliament

The Minister and Whitley

ON Nov. 14 in the House of Lords Lord BURDEN, in raising the question of the Minister of Health's refusal to implement the recent Whitley Council recommendation of a 3% increase for hospital officers, agreed that under the regulations issued in 1951 the Minister's approval was necessary. Up to the present this had always been regarded as a formality; in fact it had been understood that a Minister would not override recommendations arrived at by the collective bargaining machinery. The people employed in the National Health Service were servants of the nation. He suggested that the Government, in effect, were saying to the nation: "We will prevent you from paying to your servants salaries which, after full consideration by an impartial committee, are recommended as fair and reasonable." He thought that many people in the country were unaware of the kind of emoluments hospital officers were earning. He gave as an example a male clerk in a medical records office who earned £7 18*s.* 1*d.* a week and after deductions received £6 19*s.* 4*d.*

Lord MANCROFT, Minister without Portfolio, in his reply stressed that the Whitley Council was a negotiating and not an arbitrating body. Arbitration normally came in only if, and when, the two sides of the council failed to reach agreement. When the agreement was submitted to the Health Ministers, they took the view that the increases were inflationary and they felt that they had no alternative but to withhold their approval. They decided, however, to give at the same time an undertaking to review the question after an appropriate interval of time: in other words, their decision was not a rejection of the agreement for all time; it was rather in the nature of a deferment. The fact that the Ministers had in this instance exercised the power given them by Parliament to disapprove was in no sense an attack on Whitley standards. It had been asked, could this happen again? Lord Mancroft would give no categorical answer to that question. Every one of these agreements was looked at on its merits and in the context of economic conditions and of the Government's policy at the time. He hoped that this present case had made it clear that the Government's determination to put an end to inflation was vastly more than an empty catch-phrase; and that it had brought home to both employers and employees, not only in the health service Whitley councils, but in negotiating bodies throughout the public services and, indeed, in industry, that the national economy was a vital factor which must be taken into account by both sides in all pay negotiations at present.

Turning to the question of arbitration he said that the Ministers had discussed this possibility at their meeting with representatives of the Whitley Council. There was at present, in the technical sense, no dispute giving rise to arbitration, but it was still possible that such an issue would arise in connection with this claim. Nothing that the Ministers had said to the deputation excluded that possibility. Some of the unions representing the administrative and clerical staffs of the health service had decided to impose a ban on the working of overtime by members. Lord Mancroft deplored this decision, which the unions had taken without waiting to consider whether any more peaceable methods might be open to them. It was recognised that recruitment to the service, in the face of competition from industry, was difficult, and he gave an assurance that the forthcoming Hall report would be considered on its own merits and that the Government's decision on this 3% increase was not to be regarded as automatically ruling out approval to a new grading and pay structure in the health service expressly designed to improve career prospects.

QUESTION TIME

Royal Commission on Mental Illness and Deficiency

Mr. N. N. DODDS asked the Minister of Health what progress had been made in the consideration given to the recommendations of this Commission and what action was to be taken to improve the present situation by administrative means and also, where necessary, by legislation.—Mr. DEREK WALKER-SMITH replied: Most of the authorities and associations who were invited to send in their views on the report have now done so. Some of these are preliminary comments formulated by subcommittees and are subject to confirmation, and the views of a few other bodies are still awaited. Legislation will not be possible in the present session, but I am actively considering what can be done by administrative means in advance of legislation.

Mr. ARTHUR BLENKINSOP: In connection with the Minister's statement that some administrative action is to be taken, may I ask whether he will make some statement now about the financial position of the local authorities to enable them to carry out the new responsibilities which are to be put upon them if the proposals are to be carried out?—Mr. WALKER-SMITH: Not yet, but, of course, I have in mind the recommendations in regard to local authorities and their financial implications.

Voluntary Patients

Mr. DODDS asked the Minister what action had been taken to make voluntary care available for mental defectives in suitable cases; and why the practice of voluntary care in long-stay cases that once operated had been discarded in recent years.—Mr. WALKER-SMITH replied: The legal position has not been free from doubt, but the practical implications of the Royal Commission's recommendations on this subject are at present being discussed with the hospital authorities and local-authority associations.

Pay Beds

Mr. SOMERVILLE HASTINGS asked the Minister in how many hospitals he had agreed to a relatively large number of single-bedded side-wards being designated as section-5 pay beds on the understanding that only a much smaller number of these should be used at any one time; and what steps he had taken to ensure that in such cases a patient moved to one of these small wards for urgent medical reasons would not be returned to the main ward to make room for a paying patient.—Mr. WALKER-SMITH replied: I know of only one case in which approval has been given on this basis. I see no reason why it should have the result implied in the question. Mr. HASTINGS: Does the Minister not realise that requests have been received from two or three hospitals under the North-East Metropolitan Regional Hospital Board for this arrangement?—Mr. WALKER-SMITH: I think the difficulty which this procedure is designed to meet is that in some hospitals, including the one in question, the total demand for pay beds is low. Nevertheless, they have to be available in different parts of the hospital for different specialities at the time when the patient wants to come in. That is the situation for which this procedure is designed. Mr. HASTINGS: Yes, but will not the Minister give instructions that patients needing these beds for medical reasons will not be turned out into an ordinary ward to make room for private, paying patients?—Mr. WALKER-SMITH: Beds designated under section 5 may already be used for patients needing that accommodation urgently on medical grounds. Whether they go there, and how long they stay, is a question for the doctor who is treating the patient, and he makes the decision on medical grounds. Dr. EDITH SUMMERSKILL: I am prepared to have this designation, but I think that if a bed is being used by a sick patient who has been taken from the general ward, it is grossly unfair if the patient is removed because another patient who is in a position to pay comes in and asks for the bed.—Mr. WALKER-SMITH: I have no reason to suppose that there is any danger of such a thing happening. If there is, I will certainly consider the question of clarifying by a circular what I understand already to be the position.

Caponised Chickens

Lieut.-Colonel W. H. BROMLEY-DAVENPORT asked the Minister whether he had received advice from the Medical Research Council on the effect on humans of eating chickens caponised by hormone injections.—Mr. WALKER-SMITH replied: The advice of the Medical Research Council is that experiments have shown that any trace of œstrogen remaining in the flesh of caponised chickens is extremely small, and that neither carcinogenic nor other undesirable effects are to be expected from the use of diethylstilbœstrol. In the light of this advice, no further investigation seems called for.

Doctors' Pay

Mr. HENRY HYND asked the Minister of Health whether the doctors' claims for higher remuneration would be vetoed under the Government's wage-freeze policy.—Mr. DEREK WALKER-SMITH replied: The remuneration of doctors in the National Health Service will be considered in the light of all the circumstances prevailing at the time when the report of the Royal Commission is received.

Pneumoconiosis Examinations

Dr. BARNETT STROSS asked the Minister of Pensions and National Insurance how many workers were examined for pneumoconiosis in England and Wales by the pneumoconiosis panels last year; of these, how many claims were rejected on X-ray examination alone without clinical assessment; and how many of these latter cases were assessed as suffering from pulmonary disability after they appealed and were clinically examined.—Mr. J. A. BOYD-CARPENTER replied: In the year ending June 30, 1957, 13,597 persons were examined by the pneumoconiosis medical panels in England and Wales following claims for benefit under the Industrial Injuries Acts. Of these, 6512 were rejected on X-ray examination. There were 372 appeals against disallowance on X-ray examination, and, after clinical examination, 39 of these appellants were found to be suffering from pneumoconiosis.

Murder and Crimes of Violence

Mr. GRESHAM COOKE asked the Home Secretary what had been the monthly rate of murders to the latest available date from April 1, 1957; and what were the comparative figures for 1955. Mr. R. A. BUTLER replied: The figures normally fluctuate considerably from month to month. The number of murders recorded as known to the police for each of the six months April to September this year were, respectively, 27, 21, 34, 15, 20, and 11—a total of 128, compared with a total of 82 for the corresponding period in 1955. It is too soon to assess the effect of the Homicide Act or to contemplate a further change in the law.

Sir THOMAS MOORE: Does not this increase clearly show that the death penalty was a deterrent? How many more murders must be committed before the Government realise that in this particular case they made a grave mistake? Mr. BUTLER: The House passed the Homicide Act and, I think, it is far too soon to contemplate a change in the law. The position about numbers of murders is that they fluctuate. I am not underestimating the gravity of the figures, but we must see whether this is a fluctuation before we start envisaging a change in the law.

Brigadier T. H. CLARKE asked the Home Secretary if he would introduce flogging as a deterrent against crimes of violence. Mr. R. A. BUTLER: No, Sir. I am not satisfied that flogging as a judicial penalty is an effective deterrent. The principal offences for which it could be inflicted on adults before its abolition in September, 1948, were robbery with violence, armed robbery, and robbery in company with others. The number of these offences is still below the level of 1948, notwithstanding the general increase in crimes of violence.

Merit Awards

The estimated annual cost of the administration of merit awards is £4600, including £2100 paid to the chairman of the committee, £400 to the vice-chairman, and £30 to those members who have retired from practice.

Smoking and Cancer

The 146 county and county-borough councils in England and Wales who are responsible for health education under the National Health Service Act, 1946, were invited in June to publicise the findings of the Medical Research Council on the risks of smoking. Over half of them have taken or decided on action in one form or another, and most of the rest are considering the matter. So far 85 local health authorites have ordered publicity material from the Central Council for Health Education.

Shortage of Radiographers

At Dec. 31, 1956, there was an estimated deficiency of 523 whole-time radiographers in England and Wales—i.e., 14·8% of establishment. The corresponding figure at June 30, 1957, was 563—i.e., 15·7% of establishment. The actual numbers employed fell by only 3 during this period.

Public Health

Poliomyelitis Vaccination

New information about plans for poliomyelitis vaccination is contained in a circular (16/57) sent by the Ministry of Health to local authorities and a notice (E.C.N. 255) sent to executive councils. By about the end of this year enough vaccine will be available to protect all children born in 1942–56, those born in 1957 who are under 6 months old, and all pregnant women. Small quantities have been supplied through local authorities to hospitals for staff looking after patients with infectious poliomyelitis; vaccine will now be supplied for their families and for general practitioners and ambulance staff and their families (i.e., people living in the same house).

Imported Salk vaccine, in 10 ml. ampoules from Canada and 9 ml. ampoules from the United States, is undergoing the same tests as British vaccine, and first supplies will be ready about the end of the year. At first the quantities will exceed those of British vaccine; it is hoped that parents and expectant mothers will accept the imported material, but those who refuse will be offered British vaccine, though this may not be available till much later.

Notes are appended comparing the British and Salk vaccines. In both, the type-II virus is the M.E.F.I. strain and the type-III virus the Saukett strain; but Salk vaccine includes the Mahoney strain of type I and the British vaccine the Brunenders strain. The efficacy of the two vaccines seems comparable, and they can be used as alternatives in a course of injections. Both have proved safe in practice, and both will be subjected to the same testing in this country; the only difference is that, should any virus escape killing and detection, the Brunenders strain is less pathogenic than the Mahoney. In either case the risk is much less than that of leaving a child unvaccinated.

The vaccine should be protected from light, and stored at a temperature of 2–10°C, but not frozen. Limited exposure to temperatures up to 20°C is not harmful. The contents of any partly used vial should be discarded after 24 hours. General practitioners should send the local authority a record of every vaccination; they will receive a fee of 5*s*. for each record. It is hoped that each medical officer of health will consult his local medical committee about the part to be played by general practitioners in the vaccination scheme.

Influenza

The numbers of deaths from bronchitis have risen slightly in London, Northern England, and Wales; but those from influenza and pneumonia still fall throughout the country. The figures for the weeks ended Nov. 2 and Nov. 9 in the 160 great towns of England and Wales were 315 and 333 for bronchitis, 263 and 149 for influenza, and 404 and 306 for pneumonia. In these towns 2907 people died from influenza in the period Aug. 18 to Nov. 9 inclusive; the numbers for the same period in each of the years 1953–56 ranged from 66 to 77.

In England Now

A Running Commentary by Peripatetic Correspondents

Man and wife may be one flesh, but in the eyes of the law they are apparently still third parties. On the basis of a recent New Zealand judgment[1] when a family doctor was ordered to pay a patient £250 because he told her husband she was suffering from delusions, I reckon I've built up in the last ten years sufficient potential damages to pay off the National Debt. I shall have to look out: my routine's got to change. Next time Old Harry's chest starts filling up events must run something like this:

Straight upstairs as usual towards the distant wheezing; brief examination, prescription, certificate, and metaphoric pat on the back (also as usual). Downstairs again, find wife waiting anxiously at the bottom: "Nothing serious, is it doctor?" (still as usual). Then for my big line: "I regret, Madam, that I am prevented by the ethical code of the B.M.A. from divulging any clinical details to third parties." After a stunned moment, wife bursts into tears: "Oh Gawd he's going to die; tell me the worst doctor, I can take it." Neighbours crowd suddenly in from all sides with cups of tea and sympathy. The proliferation of third parties by this time is alarming and possible damages are in the four-figure region. Mrs. Harry is having hysterics on the settee and Harry upstairs is calling lustily for lunch and wanting to know why the —— everyone is making such a —— —— noise. There is only one way out: Harry signs a document to the effect that he freely permits me to transmit details of his illness to his wife: this is witnessed by four neighbours and signed over a sixpenny stamp, and should with luck prevent the case from going to the House of Lords anyway. I then take the wife to a private place and state carefully that in my opinion, using due skill and care, Harry has a recurrence of his chronic chest infection and his condition is so far satisfactory. It is possible that he will: (*a*) get better, (*b*) stay the same, (*c*) get worse, or (*c*) then (*a*), or (*a*) then (*b*), or any other combination. To be on the safe side I add that I cannot undertake that the operation (if any) will be undertaken by a particular surgeon. I put all this in writing too and get it witnessed. Strangely, all this does not seem to have a calming effect, and I am receiving a lot of rather odd looks as I leave.

It's going to make visits rather long drawn out at first, but I somehow feel that I shan't have many to do after the first fortnight.

* * *

The psychiatrist in a general hospital is usually a somewhat remote figure who appears at lunch perhaps and usually can be found talking about cars and income-tax and otherwise behaving like an ordinary human being. In a mental hospital the picture is very different. There, everyone strives to be well adjusted, well integrated, well rounded (personality, not person), and *never* so hopelessly inadequate or insecure as to lose his temper or even show irritation with the more infuriating of his patients or colleagues. For ordinary mortals like myself these standards are rather exacting, but when I get home in the evening I find that when I have attacked the cat with a broom, cuffed our older child smartly behind its ear, shaken the younger till its teeth rattled, slammed down a charred sausage in front of my husband with a take-it-or-leave-it slant to my jawline, and ground the potato peelings savagely into the compost heap with my heel, I am refreshed and ready to be poised and sympathetic with my neurotics next day. It may be a bit hard on the domestic circle, but its ever so abreactive.

* * *

The life of a wheat-farmer in the prairie provinces of Canada seems far removed from our traditional concept of a farmer's tied and toilsome existence here. A section and a quarter, 800 acres, is considered the economic size for a single-handed farm, and yet this entails less than six months' work in the year and the farm can be shut up during the cold months while the farmer winters in a less rigorous climate or has his hernia or varicose veins attended to in the city. Thus motels in Vancouver Island or Florida have their "no vacancy" signs up winter as

1. *Daily Herald*, Nov. 9, 1957.

well as summer, thanks to the mechanisation of farms in Alberta and Saskatchewan; and pressure on beds in Saskatoon hospitals is greatest in the first three months of the year, as with us, but not because of winter respiratory epidemics.

Hospitals in central Canada have other peculiarities. Because of the low humidity, at the University Hospital of Saskatoon everyone entering the operating-theatres must first step on a "conductometer" to discharge any electrical potential he or she may have accumulated. Ambulances drive right into the hospital, into a heated bay with self-closing doors: at 30° below freezing-point this is a necessity, but it would be an advantage in England too. Each patient has his own bedpan, sterilised in a 'Cellophane' bag and presented to him on admission, with some ceremony. And when countries as diverse as France and Canada are unanimous in building no new hospital accommodation with more than four beds to a ward, is our persistence in constructing large wards perhaps a case of "They're all out of step except our Johnnie"?

* * *

We live in one of those secluded self-contained villages which cluster round the Euston Road. As a community we are loyal, self-reliant, and rather conservative. Thus Mr. Wilkins, our coalman, has only lately exchanged his horse—three times champion of the Regent Park Whitsun van and dray horse meeting—for a lorry, and he has not yet installed a telephone. So when I noticed some two weeks ago that the level of our 5 cwt. coalbin had sunk to a dangerously low level I wrote a postcard asking him to bring us some more coal, affixed somewhat reluctantly one of the new 2½*d.* stamps, and posted it. Nothing whatever happened and last Saturday I realised with dismay that the bin now only contained two small lumps. More drastic measures were clearly necessary. In the course of my shopping I took the opportunity of describing our plight to large friendly gatherings in the dairy and the off-licence—these two strategic points were carefully chosen as everyone in our village drinks milk and/or beer. At four o'clock on Saturday afternoon Mr. Wilkins knocked at our door with a sack of coal on his back "I hear you're almost out," he said, "I'll leave you this to go on with. Bring the rest next week."

With all this talk of automation and trunk-dialling I fear the Postmaster General may be getting ideas above his station. I hope he realises that down our way his little concern is still not the most effective means of communication.

* * *

A visit from Mrs. Longhill always brightens our child-welfare clinic. Yesterday she brought Michael, but as he is registered as William there was a little difficulty in placing him. We first met Mrs. Longhill when she was Miss Whittington, though out of courtesy we called her "Mrs." Soon after the birth of her first child, however, she acquired a legitimate claim to this title by marrying Mr. Longhill. The name obviously has a lifelong attraction for her, for though she has changed men many times she is still Mrs. Longhill. Unfortunately the Longhill union was not blessed with any progeny, but after Mr. Longhill had been exchanged for an anonymous West African two little boys appeared. Out of deference to Mr. Longhill, they bear his name. Since then Mr. Koosoo has taken up residence, and has contributed four more sons, but not his name. There is a fifth child on the way; perhaps, if it is a girl, Mr. Koosoo will be rewarded by having his name conferred on her.

Mrs. Longhill is a good mother, and a good neighbour. She is a regular clinic-attender, and brings her friends' children as well as her own, when she feels it necessary. We are all very fond of her, and though her morals may be somewhat cat-like, her maternal instincts are equally well developed.

* * *

My peripatetic colleague's suggestion (Nov. 2) that the Russian satellite is a space-occupying lesion may well be correct. It certainly seems to be producing a disturbance in both hemispheres.

Letters to the Editor

EARLY ADMISSION TO HOSPITAL OF MENTALLY DEFECTIVE BABIES

SIR,—I agree with Miss Adams (Nov. 9) that there is often much to criticise in the way in which parents are brought to the knowledge that their child is defective, but I think that mistakes are as often made by withholding information as by supplying it. Four out of five mothers of children with severe mental defect, in a recent study, thought that accurate information should be supplied at the earliest possible moment.

Corlett and Kirman [1] discuss the possibilities of early accurate diagnosis of mental defect, and are inclined to accept Vernon's pessimistic rather than Gesell's optimistic view of the prediction value of mental-age estimates in very young children. But such statements do not differentiate children with a gross lag in behaviour development from those with a moderate lag which places them well to the left in the distribution curve of biologically normal people. The first group have either a recognisable clinical pathology (mongolism, Hurler syndrome, microcephaly, &c) or show, in spite of good sight and hearing and an encouraging environment, such a grave degree of retardation that, as Kanner says, they would be "abnormal in any culture". It is the prospect of social achievement which is important for the child and family, and it is usually possible to make a confident prediction, in the first year, that children in this group will never be independent.

Miss Adams thinks that advice is better given by a "consultant specially qualified in mental deficiency" (by which I think she means a member of the medical staff of an institution for mental defect) than by a pædiatrician. This is not really a practical proposition, and I am dubious about its validity. To know the abnormal, one must be very often comparing the abnormal with the normal, and the only doctors in a position to do this are general practitioners and pædiatricians.

Miss Adams speaks of mental deficiency in general, but she is really talking about the mongol child, since no doctor would venture on any prognosis for mental capacity in any other condition "within two to four weeks of the baby's birth." Mongolism is the only common abnormality (one birth in six hundred) which allows one to state with certainty the ultimate limits of mental capacity. In no case does this allow of independent life and work. I think Miss Adams does not look far enough ahead really to envisage family life with a mongol member. Since there is no evidence of "social gradient" in mongolism it would be profitable to inquire what happens to the mongol children born to successful professional or business men. I fear that it will be found that it is only "hospital class" parents who are expected to "assimilate" their mongol children. The real dilemma (as I pointed out in my letter to you last year [2]) is that genuine community care, which is offered to people with physical handicap as a matter of right, is not provided for mental handicap.

An elderly mother of an only mongol child is often wholly wrapped up in his care, and one can recognise that while it remains possible for her to look after him, nothing is gained by suggesting residential care. But when there are other normal children, I see nothing to be gained by keeping the injured child at home. There is no need for *advice*; what the parents decide should be entirely their own affair. But they do need facts, together with the offer of early community care, whether residential or not. All practising doctors have known

1. Corlett, K., Kirman, B. H. *Brit. med. J.* Nov. 16, 1957, p. 1174.
2. Leys, D. G. *Lancet*, 1956, ii, 143.

families whose lives have been poisoned, either by the pretence that a defective child or adult was a cherished member of it, or by the impossibility of arranging for his care outside the family. A recent discussion between pædiatricians and child psychiatrists disclosed the extent of our ignorance as to the feelings of parents towards gravely handicapped children: we badly need to learn from parents themselves, in situations which allow them to be truthful, what their needs really are.

Farnborough Hospital, Kent. D. G. LEYS.

DEFINITION OF STILLBIRTH

SIR,—Recently our attention was drawn to the fact that the phrase "has not breathed or shown any other sign of life" in the definition of stillbirth is capable of varying interpretations. We wrote to the Registrar General for a ruling on the matter and obtained the following reply, which may be of interest to your readers:

"For the purposes of registration of stillbirths, the Births and Deaths Registration Act, 1953 (Section 4) defines 'still-born child' as 'a child which has issued forth from its mother after the twenty-eighth week of pregnancy and which did not at any time after being completely expelled from its mother breathe or show any other signs of life.' The Registrar General has been advised that in applying this definition beating of the heart should be regarded as constituting a sign of life.

"The English statutory definition (there is a similar definition in Scotland, but stillbirths are not at present registered in Northern Ireland) is considered in its effect to be comparable with the definition recommended by the World Health Organisation in 1950, which uses the phrase 'any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles.'"

Royal College of Midwives, London, W.1. AUDREY WOOD.

IMPORTANCE OF THE ILEUM IN THE ABSORPTION OF VITAMIN B_{12}

SIR,—We were much interested to read the letter of Dr. Booth and Dr. Mollin (Nov. 16), since we have been working for some time on the problems of the absorption of hæmopoietic factors in diseases of the small intestine. Indeed, in a paper given to the Scottish Society for Experimental Medicine[1] we showed that bacteria isolated from stagnant loops at operation (mainly *Escherichia coli*) will absorb vitamin B_{12} when grown in a culture medium that contains it. This was shown both by microbiological studies and by demonstration of the fact that the radioactivity of vitamin B_{12} labelled with ^{58}Co was largely removed from the culture medium and concentrated in or on the bacteria themselves. Such bacteria did not take up folic acid, and, in fact, were able to synthesise it.

In experiments (unpublished) carried out in the department of pharmacology at Yale University last year, it was found in a series of fifteen rats that there was significant absorption of labelled vitamin B_{12} not only in the middle and distal parts of the small intestine, but also in the upper part. The labelled material was introduced into loops of small intestine that were tied off from each other and returned to the abdomen for a period of an hour after the labelled material had been introduced. The animals were then sacrificed and the remaining radioactivity measured. In some the pylorus was tied off overnight and in some for an hour before the loops were made; in others no such preliminary preparation was done. Tying off the pylorus had no consistent effect on the results. These results are in contrast with the claim of Dr. Booth and Dr. Mollin that vitamin B_{12} is not absorbed in the proximal small intestine in the rat, but from reading the paper and abstract that they quote[2,3] it was our impression that these two groups of workers had also shown that vitamin B_{12} is absorbed in the proximal small intestine.

With regard to the effect of antibiotics on the absorption of labelled vitamin B_{12} in patients with stagnant loops, it should be noted that the time of carrying out the absorption test in relation to the time of antibiotic administration may be important. In a recent case where a ten-day course of aureomycin was given, the absorption of ^{58}Co-labelled vitamin B_{12} returned to normal on the third day but was again abnormal when the test was repeated on the tenth day of such treatment. Presumably this indicated that the bacteria in the loops had developed resistance to aureomycin or been replaced by other resistant strains of organisms. The antibiotic used also appears to be of importance, and we have been able to confirm the observations of Halsted et al.[4] that the malabsorption of vitamin B_{12} may be uninfluenced by neomycin but returns to normal when one of the tetracyclines is given.

Department of Medicine, University of Edinburgh. R. H. GIRDWOOD
A. DOIG.

TRADITIONAL DOCTORS

SIR,—In his article of Nov. 9 (p. 935) Dr. FOX describes one feature of Chinese medicine which might bear further interpretation. My own reaction to the fact that scientific doctors and traditional doctors are able to cooperate, and that traditional medicine is studied in the medical schools, was one of excitement at such perspicacity. This is not because I think that much will come of studying traditional drugs and herbs, but because I think a good deal can come from studying traditional relationships between doctor and patient.

From African experience I would say that the major medical problem yet to be solved in countries with a prescientific culture is one of communication. Given the political condition of enough money and enough people, we know more than enough to match, in these countries, the health of any other modern country. But we are only beginning to learn how to persuade people who know nothing of science, whose way of life revolves around another way of thinking and whose values are remote from those of science, to accept our well-meant ministrations.

It is the immediate reaction of a doctor trained in scientific medicine to attack bare-handed traditional medicine, magic, and witchcraft. These practitioners, his predecessors in history, appear to the scientific doctor to be charlatans robbing poor people, unethical rivals even seriously harming them. But the traditional doctor has an important function in his own society. He has a special status, built up over centuries, in harmony with the values of his people, and a prestige often greater than that of the scientific intruder. He does what is expected of him, and often cures where he is expected to cure. He is usually very good at relieving anxiety, interpretation of pathogenesis, diagnosis, and, in his own terms, psychotherapy. Attacks on the traditional doctor may look to his own people like attacks on their system of values, or on the structure of their society. From the anthropological point of view this is a correct interpretation. The scientific doctor and his culture represent destructive, hostile forces.

One of the difficulties is for the scientific doctor, with his standard the Hippocratic oath and moved by sympathy and compassion, to realise and accept that he can be rejected and regarded as in some ways a hostile agent. (This is a difficulty not unknown in England when the doctor meets attitudes determined by subcultures he does not understand.) Any compromise with unscientific practice and magical explanation seems to him unethical

1. Girdwood, R. H., Doig, A. *Scot. med. J.* 1957, **2**, 313.
2. Booth, C. C., Chanarin, I., Anderson, B. B., Mollin, D. L. *Brit. J. Hæmat.* 1957, **3**, 253.
3. Spray, G. H., Reynell, P. C., Taylor, K. B. Communication to the Medical Research Society, 1957.
4. Halsted, J. A., Lewis, P. M., Gasster, M. *Amer. J. Med.* 1956, **20**, 42.

and retrogressive, a defeat for truth. And where the competition is direct, rivalry enters to make the opposition more acute. It is for this reason that the modus vivendi achieved in China seems so remarkable to me.

The applied science of medicine depends on interpersonal relations, whether we are concerned with communities or individuals; and this is the field of medical knowledge which is least developed.

MERVYN SUSSER.

Department of Social and Preventive Medicine, Manchester, 13.

PNEUMOCONIOTIC NEUROSIS

SIR,—Dr. Macdonald (Sept. 28 and Oct. 19) and Dr. Holt (Oct. 12) have been in dispute about the various standards of assessing disablement of pneumoconiotic miners. Both are right, but we believe some of their views to be wrong.

Some pneumoconiosis panels, no doubt, reject the claims for compensation of men severely disabled by dyspnœa, the result of lung changes due to chronic inhalation of dust to which they were exposed at work. Rejection is based on the absence of radiographic appearances of pneumoconiosis; boards will usually accept claims only when the radiological evidence is unequivocal. It is true, to our knowledge, that claimants who have either normal or atypical radiographs are not always examined clinically. The panel's members need not be blamed, however, because in the circumstances their decisions are governed by the strict legal definition of pneumoconiosis within a general legal directive.

On the other hand, there are an unknown number who judge such a procedure to be unjust, not to say inhumane. It is good to know, from one's experience of these cases, that some panels do not abide by the strict letter of the law in assessing claims. A few workers who, on our suggestion, applied for compensation have been granted it, in spite of a negative or atypical radiograph.

For several years, we have tried (not always with success) to obtain necropsies of men who were disabled by industrial dust inhalation in the later years of life. In these men radiographic evidence was either lacking or not typical of pneumoconiosis. Several necropsy findings were striking: numerous rather large emphysematous bullæ, often subpleural; localised emphysema; small bullæ, either localised or distributed more widely in the lungs, giving the impression of a "miliary spread"; generalised, bilateral emphysema. Microscopically, "focal emphysema," which is constantly part of simple pneumoconiosis, was fairly common. These types cannot always be identified radiographically, even in tomographs. There are differences of opinion on the point, but, for our part, we have been unable to detect focal emphysema on radiographs.

One of us (L. D.) was glad to be confirmed in this view at the recent 3rd International Congress on Pneumoconiosis in Münster, Germany. Dr. Worth, the invited speaker on emphysema, said that he had been unable to diagnose focal emphysema merely on radiographic findings. Such lesions are commonest in men up to the age of 50 years, from which one may deduce that it is not a senile change in lung parenchyma; in all, severe bronchitis had been present during life. Combination of two or more of these types of emphysema, or an advanced degree of a single type, accounts for the crippling dyspnœa in these men.[1] One is justified in regarding their bronchitis and emphysema as a direct result of inhaling irritant dusts during part or whole of their working lives.

Certainly, dust has been shown to cause focal emphysema. At any rate, our clinical, radiological, and morbid-anatomical observation show that many industrial workers become disabled by occupational lung disease when the grade of emphysema is severe. Such men are not, of course, interested in whether their disablement is attributable to emphysema or pneumoconiosis. In this respect, it seems that the law should be extended to cover cases that are not, in the present legal sense, pneumoconiotic. Then, the medical members of panels would clinically examine and positively assess men disabled by dyspnœa who had been exposed to dust, irrespective of the radiographic evidence.

LASAR DÜNNER
Hull. R. HARDY.

SIR,—The length and content of his latest letter (Nov. 16) lead me to believe that Dr. Holt has been stimulated to think harder about the problem of respiratory disease amongst miners; and he seems to have altered his view that all was well with regard to pneumoconiosis assessment. Besides making a suggestion for improving the panels, he now admits that "a change in the definition of the disease as given in the Act would be helpful." He goes on to say this would be "picking at the problem." Why pick at it? In South Africa and Australia it has been found possible to review the position, and in this country we now know "beyond a peradventure" that the present regulations are based on a misconception—i.e., that the radiograph is all important. I would reiterate that the opportunity should be taken *now* for a complete re-examination—legislative and medical—of the problem as it affects this country. The present regulations date back to 1943.

On the subject of panel examinations, I would add, in case it has not already been made clear, that, on submitting a claim, each applicant should have a complete physical examination, a chest X-ray, and a respiratory-function test. Why not?

Clare Hall Hospital, South Mimms, Barnet. NORMAN MACDONALD.

NOMENCLATURE OF THYROID DISEASE: AN INTERNATIONAL MEETING?

SIR,—The interesting and important contribution by Dr. Goudie and his colleagues (Nov. 16) on the precipitin tests in thyroid disease merits careful consideration.

In their series of 32 cases of "Hashimoto's disease", the diagnosis "depended on the demonstration of serum-protein abnormalities or on the characteristic ^{131}I findings—methods which have been shown to be of value in confirming the clinical diagnosis of Hashimoto's disease".

17 of these 32 patients (53%) were diagnosed without biopsy. The precipitin test was found to be positive in 66% of "Hashimoto's disease" and in 14% of primary myxœdema.

Without entering into minutiæ of the problem of "Hashimoto's disease", which I have discussed extensively in a recently published symposium[1] and elsewhere,[2–4] the following facts appear to be pertinent.

The valuable recent additions to our knowledge of thyroid disease make it increasingly obvious that they be founded on a truly scientific basis. I have used the precipitin and other immunological tests, electrophoretic globulin estimations, and serum-flocculation tests extensively to assist clinical diagnosis in everyday practice and in research. But, in my opinion, scientific evaluation of the thyroid must always be confirmed by adequate histological studies of the gland itself. Needle biopsies are of limited use in assessing the predominant pathological phase of this organ.

I still have to meet the clinician who can always accurately assess the presence or size of every goitre by palpation, or the predominant pathological state of the thyroid without an adequate study of the histology of the gland. Radioiodine estimations, too, can be notoriously misleading.

However, with the strong impact of radioiodine during the past decade and the recent impressive contributions of the study of immunology on the understanding of thyroid function, the failure to assess correctly the pathological

1. Dünner, L. *Zlb. Arbeitsmed.* 1957, **7**, 137.

1. Levitt, T. *Postgrad. med. J.* 1957, **33**, 352.
2. Levitt, T. *Lancet*, 1951, **ii**, 957.
3. Levitt, T. *Ann. R. Coll. Surg. Engl.* 1952, **10**, 369.
4. Levitt, T. The Thyroid. Edinburgh, 1953.

state of the thyroid would invalidate a vast amount of valuable work now being done.

Criteria of thyroid disease must be clearly defined, understood and generally agreed upon. Then and then only will pathologist be able to converse intelligibly on this subject with pathologist. Then too will clinician, surgeon, biochemist, radiotherapist, immunologist, and research-worker understand the pathologist and one another.

Now is the time for a conference, on an international level, which will bring together representatives of the various disciplines concerned. A precisely defined terminology and nomenclature may then emerge to replace the ill-understood and chaotic eponymic designations of the controversial past.

London, W.1. T. LEVITT.

BACTERIA AND INFLUENZA

SIR,—We have read with interest your leader (Oct. 26) and the recent communications (Nov. 9) on influenzal pneumonia. It is curious that Dr. Roberts (Nov. 9, p. 944) makes no reference to the sensitivity to erythromycin of the organisms (*Staphylococcus aureus*), which he isolated from his cases. Nor does its use appear to have been considered.

Surely, in view of Dr. Zinnemann's observations (Nov. 9, p. 948) on the sensitivity of *Hæmophilus influenzæ* and the probability of overwhelming staphylococcal infection in many cases, erythromycin is the antibiotic of choice.

Our experience with erythromycin in the treatment of segmental pneumonia [1] suggests that a very rapid response to treatment may be obtained, and this is surely what is required in the pneumonia of fulminating influenza.

B. M. D. ROSTEN
Hanworth, Middlesex. G. MELOTTE.

1. Rosten, B. M. D., Melotte, G. *Practitioner*, 1956, **177**, 196.

FULMINATING INFLUENZA

SIR,—I should like to congratulate Dr. Roberts on his excellent and timely article (Nov. 9). It is to be hoped that his clear exposition of the pathology in such cases will help the enthusiastic operator to desist from performing.

The hæmorrhagic state of the trachea may be well known, but if that is not a sufficient deterrent to the passage of instruments through the trachea, then surely the knowledge that the secretions are so deeply situated in the lungs will be.

I have even seen bronchoscopy (therapeutic) performed in this fulminating influenza. Recurrent bronchoscopies and a tracheotomy had to be done to remove the fibrinous exudate thus formed in the bronchial tree.

These seem additional hazards for a desperately ill patient to bear. A patient black with tracheal obstruction would obviously call for tracheotomy, but otherwise there is surely no logical basis for endotracheal manœuvres.

Dr. Roberts' conclusion (4) needs wholehearted support.

Repton, Derby. D. W. S. SHELDON.

INFLUENZAL PNEUMONIA TREATED WITH CORTISONE AND ANTIBIOTICS

SIR,—I was very interested to read the conflicting views of Dr. Breen and Dr. Gunn in last week's *Lancet*.

It would be of great clinical interest and value if the indication and contraindication for cortisone in influenzal pneumonia were published. I asked in my letter of Nov. 2 for its mode of action, but there has been no reply. I have heard it said that cortisone is of value in peripheral circulatory failure but not in myocardial failure complicating such cases. Again the age-groups are not mentioned in cases cited for and against cortisone therapy.

Perhaps this letter will stimulate our cardiologists, who have had a great deal of experience in such cases recently, to give us their expert views on the subject.

Leeds. ISAAC ROSE.

THE FLUORIDATION DEBATE IN NEW ZEALAND

SIR,—Your annotation (Nov. 9) on the report of the New Zealand Commission of Inquiry on the fluoridation of public water-supplies suggests that the commission recognised that individuals have a right to pure water, but that this right is not infringed by fluoridation because alternative private sources are accessible to New Zealand citizens. This is a little misleading. The commission in fact rejected the claim that persons necessarily have a right to *pure* water, or that when they do have any right to a supply of pure water this right refers to any particular kind of purity other than wholesomeness. Furthermore, they maintained that fluoridation does not affect the purity of the water but does, if anything, increase its wholesomeness.

The availability of private supplies was held to rebut the claim that fluoridation compelled people to drink fluoridated water, or that it infringed any right that there may be to drink unfluoridated water.

The word pure ought not now to be applied to drinking water. It was once a permissible assumption that wholesome water should be as near as practicable to chemically pure water in constitution, but it is now a mere popular misconception.

London, S.W.10. R. B. D. STOCKER.

PENICILLIN HYPERSENSITIVITY

SIR,—In your review of this subject (Nov. 9) you mention varying views on the significance of the delayed reaction to intradermal testing in cases of suspected systemic sensitivity. It appears possible that under certain conditions this reaction may have a quite definite significance.

Experimental work on serum sensitisation, [1–4] which provides a close analogy to many aspects of systemic drug sensitisation, indicated that delayed reaction to an intradermal test could imply a likelihood that, had a full dose been given, serum-sickness would have developed at about the corresponding time. The intradermal reaction appeared to be a miniature of the generalised reaction, depending on the same two factors: fixation of antigen in the skin and liberation of antibody in response to stimulation by the antigen administered.

In patients already sensitised this will occur in an "accelerated serum-sickness" timing, which in fact is variable. Delayed reaction to intradermal penicillin may develop within twenty-four hours or may suddenly flare out after several days; I have also seen the latent period lengthen in successive tests at lengthening intervals from the original episode of reaction. One may get the impression of a gradually receding degree of immunological readiness; this recession must often be rapid and complete since many patients have developed urticaria after one course of penicillin, and later taken a further course without trouble. But in other cases a liability to produce accelerated immune response may persist, and such patients may show the delayed intradermal reaction, though not generally remaining in the acute state of immediate anaphylactic reactivity.

There is, however, a possibility of a phase of anaphylactic sensitivity arising at critical times in such cases. In the work on serum it appeared that many patients would be in this state at the time of the immunological response; not only could serum administration, repeated after the due interval, produce shock, but the temporary presence of the immediate wealing reaction to intradermal test was not uncommon, even in cases

1. Kellett, C. E. *J. Path. Bact.* 1936, **43**, 503.
2. Voss, E. A. *Z. Immun. Forsch.* 1938, **94**, 281.
3. Karelitz, S., Stempien, S. S. *J. Immunol.* 1942, **44**, 285.
4. Karelitz, S. *ibid.* 1942, **44**, 285.

where insufficient tissue-fixed antigen had persisted for spontaneous serum-sickness to develop at this stage.[5]

A similar pattern of behaviour in a primary immunological response to penicillin is suggested in Bell's case, with the critical situation arising between the tenth and thirteenth days from the first injection.[6] In patients who are in a condition to make an accelerated response, this situation may arise on the second or any later day after an injection which has itself produced no evident reaction, and thus within the period of a short course of treatment. The phenomenon of anaphylactic sensitivity at such a stage is illustrated in a number of reports. In Beauchamp's case [7] and in one of the series reported by Mayer et al.[8] mild symptoms are described in the history of the course preceding the treatment which formed the main subject of the report. In other cases the anaphylactic episode, arising not from the first dose but further on in the course of the treatment, has been the actual circumstance of the report.[9–12]

Delayed reaction to intradermal testing may well indicate the possibility of such a development, since it does imply that even a small antigenic stimulus provokes early immunological response. It is certainly worth considering that a patient showing such a reaction, or equivalently delayed reaction at an injection site, may be in a state which calls for caution in any further administration of penicillin at that time, and that a patient who has shown such reaction at previous testing should be treated circumspectly throughout the early days of any penicillin course he may later receive.

Unfortunately, as may be the case with the relation of the immediate wealing reaction and the anaphylactic sensitivity, we cannot safely infer the absence of danger from a negative skin reaction. The intradermal depot of penicillin may disperse before completion of the immunological process necessary to produce the delayed reaction; thus in a patient, whom I tested soon after recovery from a severe serum-sickness type of reaction to a small dose of penicillin in a dental cone, intradermal injection of one unit was followed within the day by mild general urticaria but no particular reaction at the injection site. The higher recommended test dose may produce a more reliable local deposit, but one does not always wish to give so much in a first test. The quantitative factor could also be another cause of the "false negative," since intradermal testing may not give as effective an antigenic stimulation as the ordinary dose would. Nor do we yet know in how many cases the delayed intradermal reaction would have the serious significance which I have suggested it may sometimes have, for the presence of excess circulating penicillin, not antigenically associated with body protein, might even have a shielding effect by harmlessly absorbing lower degrees of immunological response.

These and other variables need much further study before we can have a rationale for assessment of the patient who has reacted to a drug. The scope for experiment is so limited that we depend largely for material upon the synthesis of incidental observations, all detail of which is therefore valuable. Even the most trivial-seeming detail of a case may well become illuminating. To make the most of this material it may sometimes be helpful to consider it in the light of concrete—albeit very imperfect—notions as to what may be going on, rather than as simply phenomena of sensitivity in a vague and general way.

The Radcliffe Infirmary, Oxford. R. M. MORRIS OWEN.

SIR,—In your account of the symposium on antibiotics (Nov. 2) and your leading article on penicillin hypersensitivity (Nov. 9), comment is made about anaphylactoid reactions following the injection of penicillin and its procaine salt; but neither article specifies the type of procaine penicillin suspension used.

Much evidence has been published of anaphylactoid reactions following the use of penicillin G and the aqueous suspensions of procaine penicillin. It would therefore be of interest to know whether any of your readers have seen this type of reaction following the injection of the oily suspension of procaine penicillin. I am not aware of any record of anaphylaxis following the oily injection.

Nottingham. WILLIAM H. SIMS.

THE ELECTROENCEPHALOGRAPH IN LIVER DISEASE

SIR,—I wish to protest against the experiments described by Dr. Sherlock and her coworkers and your publication of their paper in your issue of Nov. 2.

They gave large doses of ammonium chloride and high-protein diets to 65 patients with liver disease, knowing that such treatment is very liable to produce profound mental disturbance in such patients. On a previous occasion [1] Dr. Sherlock justified the giving of the same treatment to another series of patients with liver disease on the grounds that the work was "concerned with therapeutic trials and not experiments." But such an excuse cannot be accepted on this occasion.

Incidentally, we are told that psychiatric assessment is "an approach that cannot always differentiate the syndrome of hepatic coma from other organic dementias." But can it ever? Perhaps Dr. Sherlock can now say what exactly are the psychogenic features of hepatic disease which distinguish it from other psychoses?

London, W.1. M. H. PAPPWORTH.

*** Dr. Pappworth's letter has been shown to Dr. Sherlock, whose reply follows.—ED.L.

It is clear from Dr. Pappworth's letter that he has misread our communication. In our series of 62 patients with liver disease it was only necessary to administer 120 g. protein to 17 patients and only 1 received ammonium chloride. These were difficult problems of diagnosis and management. Our paper clearly states that these 17 patients without any previous history of impending hepatic pre-coma or coma received 120 g. protein daily for seven days either to assess their suitability for portacaval anastomosis or in an attempt to elucidate the significance of minor personality changes. The development of mental or neurological changes would contraindicate surgery; indeed, it would be undesirable to perform the operation without this preliminary trial.

Dr. Pappworth's second question is the differential diagnosis of hepatic "coma." This is too large and important a subject to be condensed in an answer such as this. If he is interested, he is advised to consult original contributions on this subject.[3–4] However, it is possible that he is not making this inquiry solely for medical information, but rather for the ethical implications associated with feeding patients with 120 g. protein daily. Until recently, we feel sure that Dr. Pappworth, like ourselves, always prescribed precisely such a diet for patients with liver disease. It is still the accepted textbook teaching. We are impressed by the way Dr. Pappworth has swung away so violently from this régime that he now publicly denounces it as unnecessary experimentation. We would counsel caution in this exuberance, for oral protein still plays an important part in the management of some patients with liver disease. Until some more convenient test is available, challenge diets of

5. Longcope, W. T. *Medicine*, 1943, **22**, 251.
6. Bell, R. C. *Lancet*, 1954, i, 13.
7. Beauchamp, A. *Brit. Med. J.* 1953, i, 98.
8. Mayer, P. S., Mosko, M. M., Schutz, P. J., Osterman, F. A., Steen, L. H., Baker, L. A. *J. Amer. med. Ass.* 1953, **151**, 351.
9. Harpman, J. A. *Brit. med J.* 1952, ii, 392.
10. Pick, F. J., Patterson, J. F. *ibid.* 1953, ii, 605.
11. Farmer, P. W. *Med. J. Aust.* 1953, ii, 820.
12. Salib, M. *Lancet*, 1954, i, 572.

1. *Lancet*, 1955, i, 1023.
2. Adams, R. D., Foley, J. M. *Proc. Ass. Res. nerv. Dis.* 1953, **32**, 198.
3. Davidson, E. A., Summerskill, W. H. J. *Postgrad. med. J.* 1956, **32**, 487.
4. Summerskill, W. H. J., Davidson, E. A., Sherlock, S., Steiner, R. E. *Quart. J. Med.* 1956. **25**, 245.

protein or ammonium chloride will continue to hold a valuable place in the patient's management and for his ultimate good. They rank with the two-step heart test, insulin-tolerance test, water-deprivation test, administration of quinine for suspected malaria, or emetine for amœbiasis as crude but crucial means of obtaining helpful information for the ill.

PROGNOSIS IN BACTERIAL ENDOCARDITIS

SIR,—In his paper of Nov. 9 Dr. Wedgwood emphasises the need for prophylactic antibiotics during surgical and dental operations in patients with minimal valvular disease, and refers to our finding that a patient with a late systolic murmur may develop bacterial endocarditis.[1] He then goes on to state that the disease may develop in a patient with a functional systolic murmur. This is a misconception, and if accepted, would lead to much unnecessary and even harmful use of antibiotics.

Innocent or functional systolic murmurs are of two sorts. Commonly they are soft and short, being confined to mid-systole and are attributed to the ejection of blood through normal aortic and pulmonary valves; rarely they are *confined* to late systole and probably arise in the pericardium. In mitral regurgitation the murmur is pan-systolic, though it may have a late systolic crescendo, and this causes difficulties because inaccurate observations may give the impression that the murmur is confined to late systole. In such cases, antibacterial prophylaxis is required.

London, W.1. WALLACE BRIGDEN
AUBREY LEATHAM.

PELLAGRA AFTER GASTRECTOMY

SIR,—Your leading article of Nov. 2 on anæmia after gastrectomy prompts me to draw attention to the fact that vitamin B_{12} may not be the only vitamin in this group which is not absorbed from the intestinal tract after partial or complete removal of the stomach. I have seen 3 patients in the last two years, each of whom showed the typical signs of pellagra for the first time in the spring or early summer immediately following their operation. All of the patients were consuming an adequate diet and none had "intestinal hurry" or any symptom pointing towards defective absorption of any essential nutrient other than nicotinamide. All responded at once to parenteral administration of a preparation containing a concentrate of vitamins of the B group. One of the patients had the whole of his stomach removed, and the true nature of his dermatitis was not recognised until its third reappearance in the summer of 1956, just over three years after operation. The other patients had partial gastrectomies performed, and they too gave a history of a dermatitis appearing on the exposed surfaces of the hands and face each spring or summer following the operation.

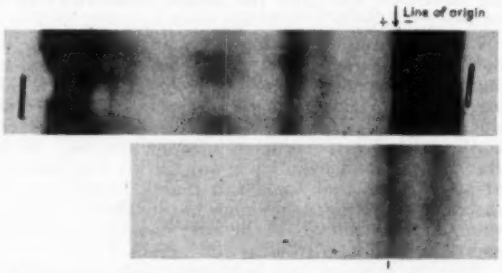
The workers mentioned in your leading article account for the development of megaloblastic anæmia in certain patients after gastrectomy on the grounds that such patients had a chronic gastritis before operation, which reduced the absorptive powers of the stomach, but this reduction was not enough to produce a frank vitamin deficiency until sufficient gastric mucosa was removed. Support for this view is given by another patient with pellagra whom I saw this summer. She was a chronic alcoholic and had been taking large doses of the vitamin-B complex by mouth when her pellagra developed. She too responded quickly to injections of concentrated vitamin-B complex. Pellagra is not uncommon in alcoholics, and it is worth bearing in mind that oral administration of nicotinamide may fail to prevent pellagra, and that it should be given parenterally. It seems reasonable to conclude from this small series of pellagrins that defective absorption of nicotinamide as well as vitamin B_{12} may follow gastrectomy, and that the cause may well lie in the chronically inflamed surviving gastric (or intestinal) mucosa as suggested in your leading article.

Guy's Hospital, London, S.E.1. E. J. MOYNAHAN.

UNUSUAL URINE PROTEIN IN MYELOMATOSIS

SIR,—Mr. Cummings (Sept. 21) reported an interesting finding in a patient with myelomatosis. Three abnormal proteins were found when the urine was examined by electrophoresis. Only one of them corresponded to the single abnormally raised component seen on electrophoresis of the plasma.

We have made a similar observation at this hospital, except that the urine contained two abnormal globulins,



Electrophoretic pattern of plasma (above) and urine (below).

and not three, neither of which appeared to correspond on electrophoresis with the abnormally raised protein fraction in the plasma.

The patient, a housewife of 69, had a three-year history of backache, to which pain radiating into the legs and bladder symptoms had been added. The body of the 10th thoracic vertebra had collapsed; and the bone-marrow contained 29% plasma cells.

She has been treated with ^{32}P and the abnormal proteins have now disappeared from the urine.

Department of Pathology,
St. Bartholomew's Hospital,
London, E.C.1. JOHN A. GOBERT-JONES.

RADIATION HAZARDS IN PELVIMETRY

SIR,—It is not generally appreciated that the technique of pelvimetry has been changing during recent years. Even before the realisation of radiation hazards the "brim view" had been superseded in many maternity centres. Since the publication of the M.R.C. report, *Hazards to Man of Nuclear and Allied Radiations*, its use is quite unjustified.[1] This does not mean that pelvimetry is unjustified. The measurement of the fœtal gonad dose given by Stafford [2] and quoted in appendix 3K of the M.R.C. report is not representative of modern practice.

Pelvimetry is usually performed in the latter months of pregnancy when the maternal ovaries are situated at the level of the iliac crests and in the usual vertex presentation the fœtal gonads are near the liver. The maternal pelvis can therefore be X-rayed without direct irradiation of the fœtal and possibly also the maternal gonads. By using an adjustable diaphragm which illuminates the area covered, the X-ray beam can be accurately limited to the part required.

Using such a diaphragm a technique has been adopted in this hospital utilising two films, a 12×10 in. lateral view and a 10×8 in. posterior view with two 3 in. exposure bands across it. The first band is a shift view of the transverse diameter of the brim taken with the tube vertical. The second band is a view of the ischial spines taken with the tube angled 15° towards the feet. These narrow bands avoid any direct irradiation of the maternal gonads.

1. Brigden, W., Leatham, A. *Brit. Heart J.* 1953, **15**, 55.

1. Blair Hartley, J. *Lancet*, 1956, ii, 46.
2. Stafford, R. W. *Brit. J. Radiol*, 1951, **24**, 226.

In random samples of films showing a vertex presentation it is found that the fœtal gonads are about 20 cm. from the central ray used in the views for pelvimetry.

Personal measurements of the ionisation in a wax phantom at this distance from the central ray failed to produce a reading on a Baldwin 'Ionex' ionisation meter set at its maximum sensitivity.

The genetic hazards to the fœtus must therefore be considered negligible when the above technique is used in cases presenting as a vertex. As little more than the skull of the fœtus receives direct irradiation the leukæmic hazard must also be very small.

Modern pelvimetry, therefore, is a comparatively safe procedure when carried out near term in cases presenting as a vertex.

Simpson Memorial Maternity Pavilion, Edinburgh. DAVID W. LINDSAY.

"MUNCHAUSEN'S SYNDROME"

SIR,—The patient reported last week by Dr. Bass and Dr. Selson is not a new case. She has already been described twice this year in *The Lancet* [1 2]; she is well known to us and we have so far traced 80 of her hospital admissions.

This letter, along with many others, suggests the practical importance of the Munchausen syndrome and the wide interest it evokes. For that reason the subject requires a much fuller investigation than can be attempted in correspondence. In fact we have recently completed a paper in which the patient referred to by Dr. Bass and Dr. Selson is included.

J. C. BARKER
T. G. GRYGIER.

SIR,—I wonder if you find these case-histories sad reading. The authors seem to have a mean glee in trying to ensure that a sick person shall get no better treatment than has been given at their hospital. This is gamesmanship; it isn't medicine. Do doctors ever wonder as Munchausen goes off on his or her weary search for understanding—and pethidine—whether admission, listening to the Baron's story, and perhaps mobilising the aid of a psychiatrist and his follow-up team might not sometimes restore the patient to a more hopeful life? (In the long run such admission and treatment might produce an economy of time and money, although that is not the prime reason for attempting it.) After all, it was very likely a doctor who gave the first doses of narcotic to Munchausen and started him on the road to addiction.

London, S.E.1. RONALD MAC KEITH.

OVER THE HILLS FROM WINDSCALE

SIR,—I am unable to share Dr. Dobson's somewhat touching faith in the "readily available advice of the Ministry of Health, Medical Research Council, and the Atomic Energy Authority" in respect of safety precautions against radioactivity. Discussion with some of my public-health colleagues shows that I am by no means alone in my scepticism regarding the infallibility of their official pronouncements. Dr. Madge has voiced the feelings of a number of medical officers of health, and we are grateful to him for the forthright way that he has stated his case.

For some time I have been perturbed at the way the official statements regarding radioactive fallout mention "safety-limit" or "safety-dose," as if the safety-levels are accurately known, and inferring that all is well so long as the figures issued by them are not exceeded. I should feel more confidence in them if they were to substitute the phrase "*presumed* safety-levels," thereby admitting that some of their information is surmise.

The increase of strontium 90 during 1956 in the bones of children aged 0–5 years is another very disturbing aspect of nuclear fallout, and it must be assumed that this increase will continue.

Regarding the investigation into the Windscale incident, it was interesting to read [1] that Sir Alexander Fleck had suggested to the Prime Minister that "it would be valuable if a medical expert were added to the committee" on health and safety. I hope that the significance of this afterthought will not be missed by the medical profession.

I cannot agree with Dr. Dobson when he asks if "access to highly technical details is of material value to medical officers of health." Medical officers of health should realise that radioactive hazards are increasing yearly, and that the time has now come for us to accept our full responsibilities towards the public in this matter. To do so, we must acquire the necessary knowledge by special courses of instruction. Ultimately, I hope that monitoring will be undertaken by public-health departments.

Public Health Department, Chichester. D. WARREN BROWNE

ROYAL COLLEGE OF SURGEONS

SIR,—I would like to bring to the attention of your readers the programme for the annual meeting of the Royal College of Surgeons of England to be held in the college on Wednesday, Dec. 11.

Last year the council was very gratified by the interest which was shown in the annual meeting, and it is hoped that there will be a similar response this year.

The scientific programme is designed to be of special interest to the general practitioner as well as to the surgeon, and a cordial invitation is extended to any member of the profession to attend the scientific films and demonstrations and the lectures, including the Bradshaw lecture.

The programme, a detailed copy of which may be obtained from the secretary of the college, includes two lectures which form part of the postgraduate course in the basic medical sciences (a lecture on the pelvis from 9.30–10.15 A.M. and a lecture on the physiology of pain from 11.30–12.15 P.M.); a programme of short scientific films of general interest (10.15–10.45 A.M. and 12.15–2.15 P.M.); demonstrations of the current research work in the college departments of pharmacology, pathology, physiology, anatomy, ophthalmology, dental science, and anæsthetics (from 10.00–11.30 A.M., 12.30–2.30 P.M., and 4.30–5.30 P.M.); and the Bradshaw lecture by Sir Russell Brock on The Present Position of Cardiac Surgery from 2.30–3.30 P.M.

In addition, fellows and members will hear an account of the activities of the college at the statutory annual meeting of fellows and members at 3.30 P.M. and will have the opportunity to discuss these and submit motions to the meeting.

The day's events will end with a monthly subscription dinner at 7.30 P.M., for which tickets may be purchased from the deputy secretary.

I hope that as many as possible of your readers will join us in the college on Dec. 11, and we can promise them a warm welcome and something to interest every one of them.

Next year the annual meeting will be held in Cardiff on Sept. 27.

Lincoln's Inn Fields, London, W.C.2. J. PATERSON ROSS. President, Royal College of Surgeons of England.

CHRISTMAS GIFTS FUND APPEAL

SIR,—I should like to remind your readers who have not yet responded to the chairman's appeal [1] that it is our custom to distribute the gifts some days before Christmas. I hope all who can will send their contributions marked "Christmas Gifts" to the Secretary, Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, Putney, London, S.W.15, as soon as possible.

FRANK JULER
Hon. Treasurer,
Royal Medical Benevolent Fund.

1. Heathfield, K. W. G. *Lancet*, 1957, 1, 533.
2. Essenhigh, D. M., Peachey, R. D. G. *ibid.* p. 638.

1. *The Times*, Nov. 16.
2. See *Lancet*, Oct. 12, 1957, p. 743.

Notes and News

BIRMINGHAM MEDICAL INSTITUTE

OPENING the new premises of the Birmingham Medical Institute on Nov. 14, Prof. Robert Platt, P.R.C.P., referred to the need for continued postgraduate education and exchange of ideas. With rapid advances in basic sciences, which had already led to revolutionary changes in therapy, nobody could afford nowadays to lag behind in methods of investigation or diagnosis. Nowhere was this more true than in general practice, which had branched off increasingly from hospital practice, but was no less successful in applying new and more powerful therapeutic measures. Here above all was found the fundamental treatment of the individual patient—the art of medicine which was the foundation on which all enduring medical practices must be built. An exciting age for general practice was beginning, in which it would be recognised as a subject in its own right, and should be taught by experts on this subject. It was up to leaders to come forward and perform their proper function, without expecting some nebulous body to emerge from the "National Health Service" or the Government, and take over that rôle. Organisations such as the Birmingham Medical Institute had a most important part to play, by bringing together hospital and general practitioners in one body, with different specialties represented.

The Institute's new house is at 36, Harborne Road, Edgbaston, where the original building has been reconstructed and a conference hall and foyer, kitchens, and a caretaker's house added. The building includes a conference hall and suite, reference library, reading-rooms, and committee rooms, and offices for various other medical bodies.

PATHOLOGY STATISTICS

IN a circular [1] issued to hospital authorities, the Ministry of Health gives details of a new simplified scheme for returns of work done in pathology laboratories, to be introduced on Jan. 1. The basis of the new system is the number of requests for work to be done, under the headings of bacteriology, biochemistry, hæmatology, and histology. The proposed form distinguishes work done for the main hospital, for other hospitals, for general practitioners, and for the Public Health Laboratory Service, and has space for necropsies and work referred to other laboratories.

THE POET AND THE PHYSICIAN

Rogers presiding at his own breakfast table, Sydney Smith delighting Lady Holland's dinner table, Dr. Johnson disconcerting Mrs. Thrale's tea table, Creevey sitting opposite Prinny in the pavilion at Brighton—our bookshelves have long offered us a choice of interesting and varied table talk. To these enviable opportunities for prandial eavesdropping, Sir Russell Brain has now added his pleasant record of Walter de la Mare's tea-time conversation.[2]

During the last five years of de la Mare's life Sir Russell, sometimes alone and sometimes accompanied by members of his family, regularly visited the Georgian house at Twickenham with two bell-pushes "each labelled 'Mr. Walter de la Mare', as if there were two of him, as perhaps there were". As a background to the "soliloquies for two" which he shared with his friend, Sir Russell hangs a skilfully woven tapestry of everyday things—the magnificent plane tree in the garden, the life-like china cat in the fire-place, Miss Saxton's delicious scones, the blue budgerigar with its blackberry sphere of an eye. But the background is deceptively simple, and the talk, for all its friendly informality, is far removed from the usual tea-table gossip. Shop, when talked by intelligent people, is always interesting, and as the talk flows round the tea-table it is remarkable how many professional interests the two men shared. Both could appreciate the "beauty and unexpectedness of the human skull"; both realised that the little "nowhere of the brain" holds the answers to many of the questions about dreams, hallucinations, time, ghosts, and memory which both the poet and the physician ask. But if much of the fascination of de la Mare's conversation lies in the questions he asked, it is clear that some of his own charm lay in his readiness to waive some of the answers. "Why should we boggle," he asked, "at the miraculous when we are surrounded by so much that we don't understand in ordinary life. The more the merrier: I can swallow Jonah and the whale." We are all grateful for this chance of joining the circle round his tolerant chair.

1. H.M. (57) 95.
2. Tea with Walter de la Mare. London: Faber & Faber. 1957. Pp. 127. 12s. 6d.

THE PILOTS' HANGAR

THE doctors and nurses of the medical service of British European Airways are pleased that their clinic is known as "the pilots' hangar", for their function, they feel, is the maintenance of the aircrew. The service is based at London Airport. Its director, Dr. A. Buchanan Barbour, is directly responsible to the chief executive of B.E.A., but the service is an advisory one; it is not a department of the administration, and is thus independent and can command the confidence of those who consult it. Besides undertaking the public-health care of B.E.A. activities and investigating flying and industrial accidents, the service is responsible for ensuring the fitness of the pilots, radio officers, and stewards, and (in happy cooperation with their general practitioners) caring for their illnesses. It makes arrangements for the medical care of all B.E.A. staff overseas, beyond the purview of the National Health Service. The service's doctors examine candidates for aircrew to ensure that they are fit for the job and likely to remain so long enough to justify the corporation's expense in training them in the use of its newer types of aircraft. They also examine aircrew after accidents and periods of illness, but are not responsible for the statutory six-monthly examination. The examinations are carried out at the central medical clinic; special emphasis is placed on ear and eye fitness and aptitude testing. The ear room includes a sound-proof audiometry cubicle, floating on cork and fibre glass, and an aural microscope. The eye room is equipped for refraction, perimetry, and colour-vision testing, and with an "Orthorater" (the only one in Europe) for testing acuity. There is also a laboratory for clinical pathology. The equipment includes a portable device (which can be used overseas) for bacteriological water-testing; this filters a sample of water through a membrane, which is also a nutrient medium, and the membrane itself is then incubated. The clinic also contains well-equipped consulting and treatment rooms; the central clinic, like the industrial medical unit which looks after the engineers at the maintenance base, runs a 24-hour outpatient service.

The service is concerned with passengers in several ways. It gives advice about the transport of invalids, and, when they are accepted, provides equipment (e.g., stretchers, privacy curtains, and oxygen) for them, though not nurses. The service provides the first-aid kits for aircraft, and trains the stewards in first-aid and survival techniques, as well as giving refresher courses in first-aid, emergency midwifery, and the elements of aviation medicine to aircrew and stewards, and hygiene lectures to caterers.

FOR THE WELFARE OF MANKIND

THE Commonwealth Fund was founded in 1918 by Mrs. Stephen V. Harkness, "to do something for the welfare of mankind." The fund has been devoted chiefly to promoting health; thus in 1956-57, nearly 90% of the total of nearly $4 million appropriated went to some health activity—more than half of it to medical education and community health activities.[1] Grants were also given to research, to subsidise publications, and for travel fellowships, many of which were awarded to postgraduate students from this country.

In the next few years the Fund will continue to be largely concerned with health. It shares the growing realisation that the scientist in mid-career, rather than his younger colleague, is now most in need of support. The new programme, which will be smaller than recent ones, will give help to these workers "and to the mature, established, and creative scholar for research and writing."

ENHAM-ALAMEIN VILLAGE SETTLEMENT

AGREEMENT has been reached by the governing body of the settlement with the Ministry of Labour, the Ministry of Health (through the South West Metropolitan Regional Hospital Board), the County Councils Association, and the London County Council for an extension of its facilities for rehabilitation and vocational training of registered disabled men. Under the new scheme, which will start on Dec. 1, men will be accepted for training who are handicapped by chronic bronchitis, emphysema, asthma, pneumoconiosis, or arrested

1. The Commonwealth Fund. 39th annual report, for the year ending June 30, 1957. Harkness House, 1, East 75th Street, New York.

tuberculosis. In the early stages men with these disabilities will be given priority, but the scheme is also open for men with locomotor disabilities such as rheumatoid arthritis, spondylitis, poliomyelitis, and limb injuries. The medical authorities of the settlement must be satisfied that they are fit for training with a view to employment within the settlement or in outside employment. It is hoped that after an experimental period with a pilot scheme women will also be admitted. As the object of training is employment in industry suitable to the disability of the trainee, arrangements should be made for every candidate applicant to see his local D.R.O. before application is made for admission to the settlement.

University of London

On Oct. 23 the degree of M.D. was conferred on Gwendolen M. G. Barton and M. J. Craft.

The following have passed the final examination for the degrees of M.B., B.S. :

Honours.—A. W. Asscher (*a*), London ; A. J. Cash (*d*), Middlesex ; J. W. Crooke (*d*), University College ; Lionel Fry (*c*), King's College ; A. M. Harris (*a, d, e, university medal*), St. George's ; J. A. Hicklin (*a, b*), London Hospital ; Joyce Hinton (*b*), St. Bartholomew's ; M. B. A. Jackson (*d*), Middlesex ; G. R. Seward (*d, e*), London ; Jennifer J. Spurr (*b*), Middlesex ; Ann K. Trimm (*b*), Royal Free.

(*a*) *distinguished in pathology;* (*b*) *distinguished in medicine;* (*c*) *distinguished in applied pharmacology and therapeutics;* (*d*) *distinguished in surgery;* (*e*) *distinguished in obstetrics and gynæcology.*

Pass.—Preto H. Aggett, R. B. Alade, Gonzalo Alvarez, K. A. Anderson, J. L. Andrews, A. J. Armour, S. H. Aynsworth, B. W. D. Badley, Gerald Baker, E. G. Beausoleil, P. H. Beighton, P. G. Benson, Gerald Bevan, Dulcie G. Billardis, Jane Bingham, Patricia J. Bishop, A. G. Blunden, Barbara J. Boucher, A. M. Braverman, I. L. C. Bray, D. I. Brough, Isobel J. T. Bryant, Peter Bunton, J. L. Canton, Gillian C. Cardy, Katharine J. Cash, William Chandler, Gillian A. Clarance, G. A. Clark, T. K. Clarke, R. E. Clayton-Jones, John Clunie, Marie C. Coakley, R. A. Colwell, G. C. Cook, James Cope, B. L. Copley, A. L. Corbett, J. D. Critchley, Dorothy Cullen, J. L. Currah, A. C. A. Daniel, A. T. Davey, K. G. Davidson, D. E. Day, Malcolm Deane, P. A. Debenham, R. F. Dorrington, Valerie M. Downton, D. B. Duff-Miller, A. K. Edwards, J. I. Edwards, L. O. V. Ekpechi, Brian Elliott, Jennifer A. Ellison, J. S. Evans, Shirley P. Evans, M. W. Everitt, J. C. Fenton, P. S. Firth, J. D. W. Fisher, J. A. Fooks, Anne Fraser-Stephen, P. J. Fryer, R. G. G. Gain, F. G. S. Gamm, A. J. A. Garlant, Patricia J. Garner, J. N. Garrett, J. M. R. Garson, Phyllis M. Gibbons, P. G. Gillam, R. J. Givans, P. F. Goddard, A. McK. Grant, I. J. M. Grant, Gabrielle J. M. Grasset-Molloy, R. J. Guyer, M. E. J. Hackett, C. I. Haines, F. G. Hall, T. J. Hall, B. H. Hamber, D. I. Hamilton, G. T. Hamilton, Gillian C. Hanson, Veira F. A. Hauxwell, P. H. R. Hawkes, Jemima Hayfron-Benjamin, E. E. Henderson, D. N. Holvey, Dorothy Horsfield, J. M. Howell, J. M. Hutchinson, A. E. Ifekwunigwe, Leon Illis, J. M. R. Irving, E. P. Jackson, A. S. Jarrett, B. T. Johnstone, G. P. Jones, H. B. Jones, Patricia H. M. Jones, B. R. Julien, C. L. Kelly, Malcolm Kiloh, C. D'. Laidlaw, Janet L. Lake, S. J. Lam, Stella M. Lawrence, Kathleen M. Lindesay, Marny A. Lloyd-Jacob, Jessie D. N. Long, D. B. Longson, T. E. McEwan, B. M. McGibbon, Millicent T. B. McGibbon, K. J. McKeeman, Margaret M. McKerrow, J. M. McLaren, I. G. MacWhirter, V. T. D. H. Major, M. J. Mann, T. F. Meen, I. J. Merrett, E. A. Mgbojikwe, Anne M. Millar, K. L. M. Mills, C. P. Monty, B. B. Mook Sang, M. J. Moore, Ada C. Morrison, M. W. N. Nicholls, T. J. Nokes, P. T. Oke, A. O. Olowe, Simeon Ovis, E. J. Parker Williams, P. H. Pattisson, R. E. Pavillard, Belinda Perry, Gillian R. Perry, J. M. Phillips, B. M. H. Pidcock, R. M. Pigache, A. M. M. Plumptre, J. A. Porritt, J. C. C. Porter, J. M. Preece, P. C. E. Puddifoot, A. E. Purkis, Savino Ravetto, Edith C. Rees, C. A. Reindorf, E. T. E. Richards, Shirley J. Richards, P. C. Richardson, Jane C. H. Richings, R. C. Rintoul, Michael Roberts, M. R. G. Robinson, T. R. Robinson, Audrey F. Rogers, E. D. Rosen, K. W. Rowden, Elizabeth F. D. Rowswell, J. G. Russell, R. de K. G. Samuel, Pauline J. Sandison, J. F. Sansome, David Segall, Marie-Luise B. Seidler, I. D. Simpson, Belissa R. Smith, R. P. Snaith, A. H. R. Spong, P. G. Stableforth, T. H. F. Staunton, Edwin Stockdale, I. M. Stuart, P. A. R. Sukhbir, W. K. Sutton, P. I. Taggart, C. N. Taylor, J. H. Taylor, J. L. Taylor, R. S. Taylor, Henry Teed, J. A. Theobald, E. M. Thomas, A. G. Thomson, Marlene J. Thrussell, R. J. Tolson, H. M. Tuddenham, Mary C. Underwood, Jayamanee Venkatasamy, R. H. Visick, Elizabeth A. Vyle, Jean M. Ware, Nancy M. Watts, Thomas West, J. F. Whitaker, William Whitrow, Jane Whybrow, F. T. Whyte-Venables, E. S. Williams, J. C. L. Williams, D. S. Wilson, Maureen M. Winter, D. J. Wood, Audrey J. N. Woolf, M. J. Young.

University of Edinburgh

Lewis Cameron postgraduate prize—This prize (£45) may be awarded in July, 1958, to a graduate of not more than five years' standing for original work on the diagnosis of disease. Papers must reach the dean of the faculty of medicine by April 5.

School Health and Health Education

A four-day seminar on this subject, for medical officers of health, will be held by the Central Council for Health Education at the Ivanhoe Hotel, Bloomsbury Street, London, W.C.1, from Feb. 25 to 28. Medical speakers will include Dr. Peter Henderson, Dr. J. D. Kershaw, Dr. R. E. Smith, Dr. M. E. M. Herford, and Dr. Marion Taylor. Further particulars may be had from the medical director of the council, Tavistock House, Tavistock Square, W.C.1.

Queen's University, Belfast

Dr. John Pemberton, senior lecturer in social medicine in the University of Sheffield, has been appointed to the chair of social medicine.

Dr. Pemberton graduated M.B. Lond. in 1936 from University College Hospital, and after holding house-appointments there he joined the staff of the Rowett Research Institute in Aberdeenshire as a clinical research worker. In 1940 he took the M.D. and the following year the M.R.C.P. About this time he went to Sheffield, where at first he was medical first assistant and medical tutor at the Royal Hospital. Later he joined the department of medicine in the university as a lecturer in social aspects of medicine, and when an independent department of social medicine was set up he was appointed to his present post. His published work includes papers on the assessment of vitamin C, the teaching of social and preventive medicine, the health of students, and (jointly) a comprehensive study on the health of the aged at home.

Royal College of Surgeons of England

At a meeting of the council on Nov. 14, with Sir James Paterson Ross, the president, in the chair, Sir Simon Marks was elected an honorary fellow.

The Begley prize was awarded to P. A. Evans, of King's College Hospital Medical School.

Licences to practise and postgraduate diplomas were conferred on those named in the report of the comitia of the Royal College of Physicians in our issue of Nov. 9 (p. 956) and on the following :

D.C.H.—D. A. Andrews, Barbara Baxter.

Drummond Fellowship for Research in Nutrition

Applications will be considered in March for a senior fellowship (£1100 per annum). Particulars may be had from the hon. secretary, Drummond Trust, University College, London, Gower-street, W.C.1, to whom applications should be sent before Jan. 31.

Institute for the Study and Treatment of Delinquency

The annual general meeting of this institute will be held on Tuesday, Nov. 26, at 5.30 P.M. at 11, Chandos Street, London, W.1. The meeting will be addressed by Sir Lionel Fox, chairman of the Prison Commission.

Mental Hospital Nurses

The ban on overtime for nurses, which is being called by the Confederation of Health Service Employees in selected mental hospitals, has now been introduced at Rubery Hill Mental Hospital, Birmingham, and St. George's Hospital, Stafford.

Westminster Hospital

A theratron cobalt unit has been given to this hospital by Mr. Michael Wix through the British Empire Cancer Campaign, and on Nov. 4 Viscount Kilmuir, the Lord Chancellor, unveiled a plaque commemorating the gift and opened a new physiotherapy outpatient department which had been built partly as a result of the gift.

British Association of Urological Surgeons

The annual meeting of this association will be held in London on June 19, 20, and 21. The programme will include a discussion on carcinoma of the prostate, when the opening speakers will be Mr. Arthur Jacobs, Dr. L. M. Franks, Mr. W. H. Graham, Dr. J. Bamforth, Mr. T. D. Fergusson, and Mr. T. J. Millin.

British Standard for Hospital Sterilisers

A new British Standard (B.S. 2904) specifies requirements for boiling-water sterilisers, distinguishing those heated by electricity, gas, and steam, and those for various purposes—for instruments, bowls, bedpans, &c. The range of sizes has been narrowed, but a wide variation in design has been permitted. Copies of the Standard, price 7*s.* 6*d.*, may be obtained from the Sales Branch, British Standards Institution, 2, Park Street, London, S.W.1.

Whitley Dispute

A meeting of delegates of the National and Local Government Officers' Association on Nov. 17 agreed to a ban on overtime among administrative and clerical staffs in the health service as a protest against the Minister of Health's rejection of the 3% pay increase recommended by their Whitley Council. The ban, which was introduced on Nov. 19, limits work to 38 hours a week. In a letter to *The Times* (Nov. 19) the organising secretary of the National Federation of Hospital Officers, while deploring the Minister's decision, expressed the federation's disapproval of this decision on the ground that "the type of sanction available in industry is not available to hospital staffs." In the federation's view the proper action of the trade unions in present circumstances is to "withdraw from negotiating machinery which has shown itself to effect no useful purpose."

Medical Appointment to Atomic Energy Committee

Dr. B. W. Windeyer, professor of radiology in London University at the Middlesex Hospital Medical School, has been appointed to the committee in health and safety which is one of the three committees set up, under the chairmanship of Sir Alexander Fleck, to consider the organisation of the factories of the Atomic Energy Authority.

Women Candidates Only

For nearly a year doctors and patients in Edinburgh have been discussing whether a consultant vacancy in the Bruntsfield and Elsie Inglis Hospitals should be restricted to women candidates (See *Lancet*, 1957, i, 539). An order banning the appointment of a male doctor was sought this month in the Court of Session by 10 Edinburgh women, and on Nov. 15 (*Times*, Nov. 16) Lord Walker granted an order that no man should be appointed to the post until it had been advertised for women applicants only. Giving judgment, Lord Walker said that it was the duty of the Secretary of State to secure the objects for which these hospitals had been used before the National Health Service. The legal question turned on the use of the word "practicable" in the National Health Service Act. He did not consider it possible to determine, by hearing evidence, whether or not the appointment of a woman consultant was not "practicable" until the post had been advertised for women applicants only. The Solicitor-General for Scotland asked Lord Walker not to sign his interlocutor for a week, so that counsel for all parties could consider the position.

Dr. J. le Fleming Burrow, professor emeritus of clinical medicine in the University of Leeds, has been appointed hospital director at Addis Ababa.

Diary of the Week

Nov. 24–30

Monday, 25th

UNIVERSITY COLLEGE, Gower Street, W.C.1
5 P.M. Dr. Harry Harris: Human Biochemical Genetics (first of three lectures).

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
3 P.M. (Hammersmith Hospital, Ducane Road, W.12.) Mr. John Stallworthy: Surgical Accidents in Obstetrics and Gynæcology.

INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, W.C.1
5.30 P.M. Prof. F. Brücke (Vienna): E.E.G. Patterns in the Rabbit's Hippocampus as a Test for Drugs Acting on the Central Nervous System.

MANCHESTER MEDICAL SOCIETY
9 P.M. (University of Manchester.) *General Practice*. Prof. Fraser Brockington: A Doctor Looks at the Far East.

Tuesday, 26th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. H. R. S. Harley: Development of the Sinus Venosus Type of Atrial Septal Defect. (Arris and Gale lecture.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Medicine*. Dr. P. B. Bedford, Dr. Reginald Kelley, Mr. Lawrence Walsh: Intracranial Hæmorrhage.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Dr. George Gordon: Central Sensory Representation.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, W.2
5 P.M. Dr. K. V. Bailey: Assessment of an Obstetric Situation.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. D. I. Williams: Use of Vitamins in Dermatology.

ROYAL ARMY MEDICAL COLLEGE, Millbank, S.W.1
5 P.M. Dr. Arthur Willcox: Polyarteritis Nodosa.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Physiology Department, Queen's College, Dundee.) Mr. J. A. Gillespie: Methods of Measurement of Peripheral Blood Flow in Man.

Wednesday, 27th

ROYAL SOCIETY OF MEDICINE
8 P.M. Lord Adrian: The Analysis of the Nervous System. (Sherrington lecture.)

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
2 P.M. Dr. W. T. Cooke: Disorders of Fat Metabolism.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. J. N. Pattinson: Congenital Abnormalities of the Pulmonary Arteries.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Arthur Tickner: Fats and the Skin.

INSTITUTE OF NEUROLOGY
5.30 P.M. Dr. Denis Williams: The Epilepsies.

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
4 P.M. (Queen Charlotte's Hospital, W.6.) Mr. Hector MacLennan: The Elderly Primigravida and her Treatment.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. Stephen Hall: Impact of Tuberculosis in the Household.

BIRMINGHAM MEDICAL INSTITUTE, 36, Harborne Road, Edgbaston, Birmingham
8 P.M. *Psychiatry*. Dr. P. M. Jeavons, Dr. P. B. Bradley: Scope and Limitations of Electroencephalography.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow.
5 P.M. Mr. David Wallace: Bladder Tumours—A Challenge to the Medical Profession. (Weild lecture.)

Thursday, 28th

UNIVERSITY OF LONDON
5 P.M. (St. Mary's Hospital Medical School.) Prof. G. Mayer (Bordeaux): Physiological Factors in Implantation of the Egg.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Dr. J. H. Taylor: Physiological Problems Associated with Diving and Underwater Swimming.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. C. D. Calnan: Epidermal Sensitisation.

LONDON COUNTY MEDICAL SOCIETY
5.30 P.M. (County Hall, S.E.1.) Prof. M. L. Rosenheim: Modern Management of Hypertension.

RESEARCH DEFENCE SOCIETY
5.30 P.M. (University College, Gower Street, W.C.1.) Lord Cohen of Birkenhead: Some Reflections on Animal Experiments. (Stephen Paget lecture.)

NUFFIELD ORTHOPÆDIC CENTRE, Wingfield-Morris Orthopædic Hospital, Oxford.
8.30 P.M. Mr. J. C. Scott: Report on Four Months in Canada.

LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. Dr. S. Barton Hall, Dr. Hugh Jarvie: Psychological Symptoms of Organic Significance.

HONYMAN GILLESPIE LECTURE
5 P.M. (University New Buildings, Teviot Place, Edinburgh.) Dr. John Stanton: Recent Approaches to Disorders of Speech and Language.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Physiology Department, Queen's College, Dundee.) Prof. J. W. Howie: Infections Acquired in Hospital.

Friday, 29th

POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Mr. Hilary Wade: Injury to the Recurrent Laryngeal Nerve at Thyroidectomy.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
3.30 P.M. Mr. J. C. Hogg: Indications for the Removal of Tonsils and Adenoids.

BRITISH TUBERCULOSIS ASSOCIATION AND SOCIETY OF MEDICAL OFFICERS OF HEALTH
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Dr. H. D. Chalke: Rôle of the Medical Officer of Health in Tuberculosis Control. Dr. Neville Irvine: Value of the B.C.G. Vaccination in Children. Dr. C. M. Smith: Milk Control. Dr. F. C. S. Bradbury: Control and Rehabilitation of the Chronic Patient.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos Street, W.1
7.30 P.M. Mr. A. J. King: Syphilis of Bone.

Appointments

ATKINSON, P. I., M.B. Calcutta: school M.O. and assistant M.O.H., Coventry.

BOUTON, MARIE J., M.D. Lond.: assistant pathologist, Liverpool Children's Hospital group.

BRADSHAW, J. P. P., M.D. Lond., M.R.C.P.: assistant neurologist (consultant), Royal Infirmary and Royal Hospital, Sheffield.

BURN, J. K. A., M.B. Aberd., D.A.: part-time assistant anæsthetist, Grimsby General Hospital.

KEEVE, MARY F., M.B. Lpool: school M.O. and assistant M.O.H., Coventry.

O'CONNELL, B. A., M.B. N.U.I., D.P.M.: consultant, Broadmoor Institution, Crowthorne.

WHITELAW, R. G., M.D. Glasg., M.R.C.O.G.: obstetrician and gynæcologist (consultant), West Fife group of hospitals.

WILSON, J. K., M.D. Lpool, M.R.C.O.G.: part-time consultant obstetrician and gynæcologist, North Wirral and Birkenhead groups of hospitals.

Colonial Appointments:

* CHEN, J. H. M., M.B. Hong-Kong, F.R.C.S.: specialist (surgical), Hong-Kong.

CLEARKIN, J. G., M.B.E., M.B. Belf., D.P.H.: special grade M.O., Kenya.

CRUCHLEY, F. H. N.: M.B. Lond.: senior M.O. (health), Jamaica.

HERLINGER, HANS, M.D. Malta, D.M.R.D.: radiologist, British Guiana.

LEITCH, NEIL, B.M. Oxon, D.T.M. & H., D.P.H.: chief M.O., Northern Nigeria.

MACKENZIE, ISOBEL P., M.B. Edin., D.P.H.: M.O., Zanzibar.

TOH, CHOONG HIENG, L.M.S. Singapore: medical superintendent, Tan Tock, Seng Hospital, Singapore.

* Amended note

Births, Marriages, and Deaths

BIRTHS

VINE.—On Nov. 1, at Battle Hospital, Reading, to Denise (née Waldon) and Dr. S. M. Vine—a daughter.

WILKINSON.—On May 5, to Clodagh (formerly Boyd, of Capetown), wife of Dr. J. B. Wilkinson, of 20, Drury Lane, Lincoln—a daughter.

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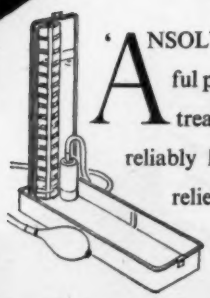

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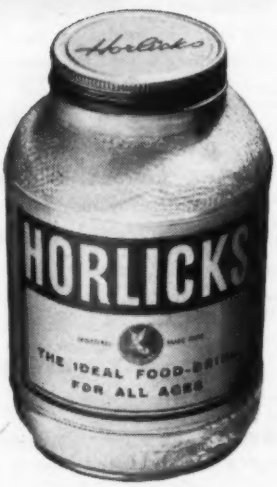

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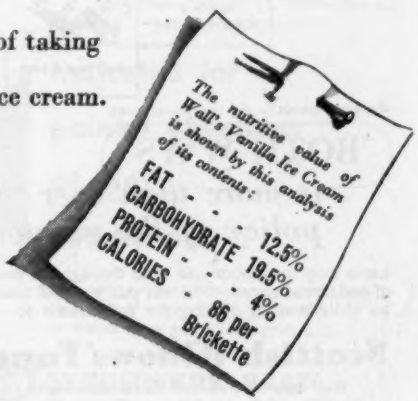
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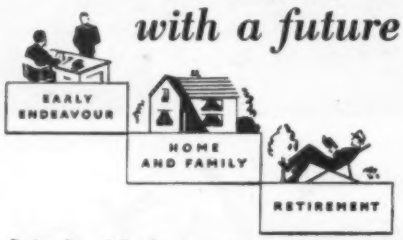

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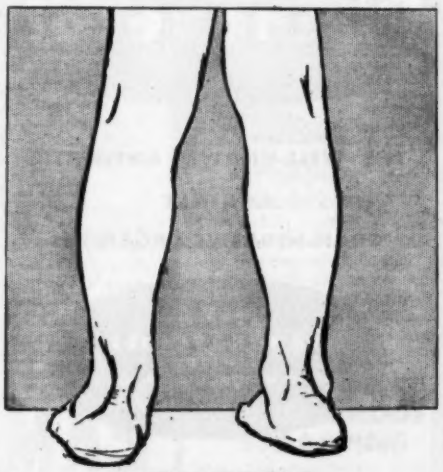

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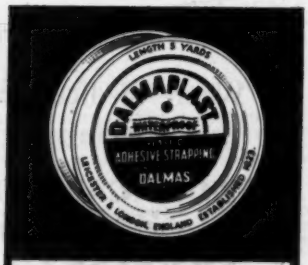

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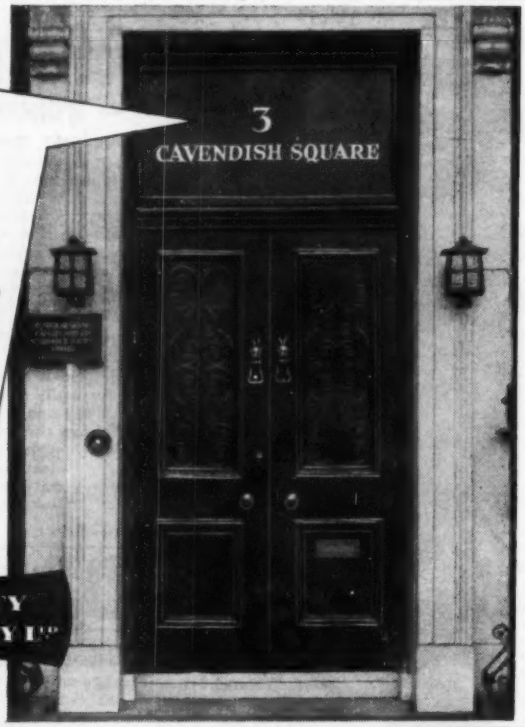

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Academic and Educational

ROYAL COLLEGE OF PHYSICIANS

SALTWELL RESEARCH FUND

Applications are invited for a Saltwell Research Fellowship value £1300 a year with superannuation arrangements. The Fellowship is for a period of 1 year, renewable up to a total period of 3 years. Under the terms of the Fund the Fellow appointed must engage in research work of any type, including clinical epidemiological or laboratory studies in connection with cancer, rheumatism, malaria or morbid conditions of the prostate gland.

Applications, accompanied by the names of 2 referees, should state details of the proposed work, under whom it is proposed to undertake the work and the name of the institution where the work is to take place. A grant for reasonable expenses may be paid to the institution concerned.

Further details may be obtained from the Secretary of the Trustees, the Assistant Registrar, Royal College of Physicians, Pall Mall East, London, S.W.1, by whom applications for a Fellowship must be received not later than 24th February, 1958.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

JEAN HUNTER BEQUEST

A Prize of £50 is offered under the terms of this trust for an essay on "The Treatment of Neurological or Psychiatric Disorders, with Special Reference to Hydrotherapy."

Applications are invited from Licentiates, Members and Fellows of the College and from graduates of Edinburgh University. Essays must be received by the Secretary, Royal College of Physicians, Edinburgh 2, not later than 31st March, 1958.

THE ROYAL SOCIETY

ROYAL SOCIETY RESEARCH FELLOWSHIP

Applications are invited by the Council of the Royal Society for a Royal Society Research Fellowship in Cytology and/or Cyto-chemistry with special reference to malignant cells. The Fellowship is tenable in any university, hospital, or medical school in the United Kingdom or at any other place approved by the Council of the Royal Society.

The appointment falls into the category of the Society's research fellowships which are intended for younger persons. It will be 2 years in the first instance, from 1st October, 1958, or a date to be arranged, and may be renewed annually up to a total of 5 years. It will be subject to the conditions governing Royal Society Research Appointments. The stipend will be in the range £1450 to £1850 p.a., depending upon qualifications. There will be superannuation benefits to which the successful candidate will be required to contribute 5% of annual stipend and to which the Society will contribute a sum equivalent to 10% of the annual stipend. Children's allowances are payable.

Applications should be made on forms to be obtained from the Assistant Secretary, The Royal Society, Burlington House, London, W.1, and should be received not later than 15th February, 1958.

November, 1957.

UNIVERSITY OF LONDON

A LECTURE entitled "Physiological Factors in Implantation of the Egg" will be delivered by Prof. G. MAYER (Bordeaux) at 5 P.M. on 28TH NOVEMBER at St. Mary's Hospital Medical School (Wright-Fleming Institute Lecture Theatre), Norfolk-place, Paddington, W.2.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

FACULTY OF ANÆSTHETISTS
of the
ROYAL COLLEGE OF SURGEONS OF ENGLAND

THE FREDERIC HEWITT LECTURE will be delivered by Dr. M. D. NOSWORTHY, F.F.A.R.C.S., on "Pseudo-Science and Modern Anæsthesia" at 4 P.M., on THURSDAY, 5TH DECEMBER, 1957.

Medical practitioners, dental surgeons and advanced students are eligible to attend.

SOCIETY OF APOTHECARIES OF LONDON

DIPLOMA IN INDUSTRIAL HEALTH

The next Examination will begin on MONDAY, 9TH DECEMBER, 1957. The following Examination will be held in July, 1958.

For Regulations apply Registrar, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

NAPT

SYMPOSIUM ON CARDIAC PROBLEMS FOR GENERAL PHYSICIANS. Chairman: K. SHIRLEY SMITH, B.SC., M.D., F.R.C.P., FRIDAY, 6TH DECEMBER, 3.30–6.30, Great Hall, B.M.A. House, W.C.1.

Tickets, including afternoon tea and sherry, 10s.

Details from NAPT, Tavistock House North, W.C.1.

THE ROYAL LONDON HOMŒOPATHIC HOSPITAL
Great Ormond-street and Queen-square, London, W.C.1

COURSES OF INSTRUCTION IN THE PRINCIPLES AND PRACTICE OF HOMŒOPATHY for medical practitioners and senior students of medicine.

WINTER COURSE

These lectures, which commence on MONDAY, 6TH JANUARY at 4 P.M., are given under the auspices of the Homœopathic Research and Educational Trust and deal with the subjects required for examination for the Diploma of The Faculty of Homœopathy. Fee for registered medical practitioners, £10 10s. per session; medical students admitted without charge.

Full particulars can be obtained on application to the Dean of the Education Course at the Hospital.

THE UNIVERSITY OF MANCHESTER.

Applications are invited for a post of RESEARCH ASSISTANT in the Department of Bacteriology. The successful candidate will be required to assist in a programme of work on immunochemistry. The appointment will be made for 1 year in the first instance, and preference will be given to candidates with a postgraduate degree and suitable experience in biochemistry and microbiology. Salary in the range £700–£750 p.a.

Applications should be sent not later than 14th December, 1957, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

UNIVERSITY OF MANCHESTER.

Applications for the post of LECTURER IN OCCUPATIONAL HEALTH are invited from registered medical practitioners. Candidates should have had practical experience of industrial medicine or of research. Duties will include medical work in industry. Salary not less than £1750 p.a. with membership of the F.S.S.U. and children's allowance-scheme.

Applications should be sent not later than 14th December, 1957, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

INSTITUTE OF UROLOGY.

In association with ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS. Applications are invited for an appointment as RADIOLOGICAL RESEARCH ASSISTANT for 3 notional half-days per week, mainly in the X-ray Departments of St. Peter's and St. Paul's Hospitals. Salary at the rate of £680 p.a. The appointment will be for 1 year in the first instance. Candidates should be prepared to undertake research in the cine-radiography with the image intensifier and should have experience in radiology.

Applications, with the names of 3 referees, should be forwarded to the Secretary, Institute of Urology, 10, Henrietta-street, London, W.C.2, by 20th December, 1957. Further information may be obtained on request.

AMENDED ADVERTISEMENT

IMPERIAL CANCER RESEARCH FUND
DIRECTOR OF RESEARCH

The Council invite applications for the post of Director of the Research Laboratories of the Fund in Lincoln's Inn-fields and at Mill Hill.

The Council's choice will not necessarily be limited to those with a medical qualification or to those making formal application and they reserve the right to fill the post by invitation.

The Fund has laboratories at Mill Hill and is about to erect a modern laboratory block next to the Royal College of Surgeons in Lincoln's Inn-fields, London. The Director will take a major part in the planning of these laboratories and will be responsible for both groups of laboratories.

The Director's salary will be in the range £4000 to £6000 p.a. with appropriate children's allowances and membership of the F.S.S.U.

Applications, of which 30 copies are requested, should include an outline of the applicant's previous experience in cancer research and his ideas of profitable directions which future cancer research should take. They should reach the Secretary, from whom further particulars and terms of appointment may be obtained, by 31st December, 1957.

KENNEDY CASSELS, Secretary.

Royal College of Surgeons of England,
Lincoln's Inn-fields, London, W.C.2.

Hospital Services: Senior Appointments

BRISTOL. UNITED BRISTOL HOSPITALS (Bristol EYE HOSPITAL). SOUTH-WESTERN REGIONAL HOSPITAL BOARD. The United Bristol Hospitals (which includes the Bristol Eye Hospital) and the South-Western Regional Hospital Board jointly invite applications for a post of CONSULTANT OPHTHALMIC SURGEON. Initially the appointment will be for 5 sessions in the Teaching Hospital and 1 session for the Regional Board in the Bristol Clinical Area. The terms and conditions of service recently negotiated between the Ministry and the Profession will apply to the appointment.

Applications, stating full Christian names, age and particulars of education, qualifications and experience, accompanied by 2 recent testimonials and the names of 2 referees, should be sent to the Secretary, Bristol Royal Infirmary, Bristol, 2, from whom further particulars can be obtained, not later than Monday, 16th December, 1957.

LIVERPOOL REGIONAL HOSPITAL BOARD. Clatterbridge HOSPITAL. Applications are invited for the post of Part-time DENTAL SURGEON (Senior Hospital Dental Officer) giving 1 notional half-day at the above hospital. Applicants should have had considerable experience, including hospital experience, in dental surgery.

Forms of application from Dr. T. LLOYD HUGHES, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 14th December, 1957.

VINCENT COLLINGE, Secretary to the Board.

MANCHESTER REGIONAL HOSPITAL BOARD. Locum CONSULTANT ANÆSTHETIST required to the Lancaster and Kendal Group of hospitals: whole-time or maximum part-time. Salary according to individual status—wide experience and high qualification essential.

Applications, together with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CONSULTANT RADIOLOGIST, 5 half-days a week, Ashford Hospital, Ashford, Middlesex (562 Beds) and Hounslow Hospital, Hounslow, Middlesex (81 Beds). Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, before 30th December, 1957.

OXFORD REGIONAL HOSPITAL BOARD. Assistant PHYSICIAN (geriatrics) (Senior Hospital Medical Officer grade). Whole-time to work under the supervision of the Consultant Physician (geriatrics) in the Buckinghamshire Area. Duties at Amersham General Hospital (102 chronic sick beds), also at High Wycombe (33 Beds) and Aylesbury (79 Beds). Candidates should have good experience in general medicine as well as a special interest in geriatrics. A higher qualification would be an advantage. Present holder has obtained Consultant appointment and post will be available 15th February.

Further information from the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, to whom applications (12 copies), stating age, qualifications, &c., and names of 3 referees, should be sent by 28th December.

LEEDS REGIONAL HOSPITAL BOARD.

CONSULTANT in Anæsthetics (maximum part-time sessions). Hospitals in the East Riding of Yorkshire—mainly at Westwood Hospital, Beverley. 1 session at Hull Royal Infirmary. Person appointed to reside in Beverley.

Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer scale), Broadgate Hospital, Beverley, and associated clinics at Beverley, Driffield, and Hull. Married accommodation may be available. Candidates should normally hold a D.P.M. but applications will also be considered from candidates without previous experience in psychiatry who hold a higher medical qualification, have had wide experience in general medicine in the Senior Registrar grade and intend to obtain a D.P.M. and specialise in psychiatry.

Whole-time ASSISTANT RADIOTHERAPIST (Senior Hospital Medical Officer scale) in the Regional Radiotherapy Service for duties mainly at the Hull Royal Infirmary. Relief duties as may be required at other radiotherapy centres in the region. The person appointed to work under the supervision of the Consultant in Radiotherapy and to reside in the Hull area.

Applications (12 copies), stating age, qualications and details of present and previous appointments with dates, and names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 10th December, 1957.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of CONSULTANT PHYSICIAN at the Homœopathic Hospital, Glasgow. The appointment will be part-time, remunerated on the basis of 5 notional half-days per week.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Whole-time ASSISTANT ANÆSTHETIST, based at Ayr County Hospital with duties at Seafield Hospital and elsewhere within the Ayrshire area as required. Salary (at age 32 and over) on the scale £1653 15s.–£52 10s.–£2126 5s.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT SENIOR CASUALTY OFFICER required at the Beckett Hospital, Barnsley. Salary scale, £1653 15s.–£52 10s.–£2126 5s. p.a. Tenure for a period not exceeding 4 years.

Application form and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 14th December, 1957.

SHEFFIELD REGIONAL HOSPITAL BOARD. Maximum Part-time CONSULTANT RADIOLOGIST required. Duties mainly in hospitals in the Mansfield area.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 21st December, 1957.

NEW ZEALAND. NORTHLAND HOSPITAL BOARD. Part-time MEDICAL SUPERINTENDENT, Rawene Hospital, and DIRECTOR, Hokianga Special Area Medical Service. Applications are invited from qualified medical practitioners for the above combined position. A free house is available. The present salary payable is in the range of £2140–£2240. Travelling expenses are also payable. Some surgical experience is desirable.

Conditions of appointment available from the High Commissioner, New Zealand House, London, or the undersigned, with whom applications close on 30th December, 1957.

The Secretary, Northland Hospital Board.

P.O. Box 403, Whangarei, New Zealand.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD, DUNEDIN, NEW ZEALAND. Applications are invited for the position of DIAGNOSTIC RADIOLOGIST, Otago Hospital Board. Applicants must hold a degree in medicine of an approved university and possess a higher qualification in the specialty. The salary payable will be that of a Junior or Senior Specialist under the Hospital Employment Regulations, viz., £1640–£2340 p.a. The commencing salary will be determined in accordance with the qualifications and experience of the appointee. The position is a full-time and non-resident one. Travelling expenses as set out in the conditions of appointment will be paid when a contract of service is signed. Conditions of appointment and application forms may be obtained from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or from the office of the High Commissioner for New Zealand, 415, The Strand, London.

Applications, stating, age, qualifications and experience, together with testimonials, health and radiological certificates, will be received by the undersigned until 10 A.M. on Monday, 3rd February, 1958. W. A. WILLIAMSON, Secretary.

Otago Hospital Board, P.O. Box 946, Dunedin, N.Z.

OXFORD REGIONAL HOSPITAL BOARD. Locum CONSULTANT in Ophthalmology, 4 sessions weekly, Aylesbury area, from 1st December.

Apply immediately, stating age, qualifications, experience, and names of 2 referees, to Secretary, 43, Banbury-road, Oxford.

Hospital Services: Junior Appointments

BROMPTON HOSPITAL, S.W.3. Applications invited for the following posts :—

NON-RESIDENT SURGICAL OFFICER (post graded as Senior House Officer or Registrar, according to qualifications and experience) for 6 months from 1st February, 1958, with eligibility for reappointment. Candidates must have held a resident hospital appointment.

RESIDENT HOUSE PHYSICIAN (3 vacancies). 2 vacancies for 6 months from 1st February, 1958. Duties include work in Outpatient Department and wards. 1 vacancy for 9 months from 1st February, 1958. The first 3 months at Brompton Hospital Sanatorium, Frimley, and the following 6 months at the Hospital in London covering work in Outpatient Department and wards. Salary at the rate of £577 10s. p.a.

RESIDENT HOUSE PHYSICIAN to the Cardiac Department for 6 months from 1st February, 1958. Duties include work in Outpatient Department and wards. Salary at the rate of £577 10s. p.a.

Applications, stating age, qualifications with dates, nationality and appointments held, together with copies of testimonials, by 7th December, 1957, to KENNETH A. F. MILES, House Governor.

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. HOUSE SURGEONS (2), resident. Vacant 1st January, 1958, and 10th January, 1958. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 26th November, 1957.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER required in General Surgery and Neurological Department. Pre-registration candidates would be considered. Post vacant 24th December.

Applications, with 2 testimonials, to Medical Director by 30th November.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (123 Beds.) 2 HOUSE SURGEONS required for 6 months. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (123 Beds.) Applications are invited for the post of SECOND CASUALTY OFFICER with duties in the Department of Orthopædic and Traumatic Surgery (Senior House Officer grade). Recognised for F.R.C.S. Salary £819 10s. p.a. less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

DULWICH HOSPITAL, East Dulwich-grove, S.E.22. Applications invited for appointment as SENIOR HOUSE OFFICER (obstetrics and gynæcology). Post vacant from 1st January, 1958. There is an association with King's College Hospital Medical School for teaching purposes. Recognised for M.R.C.O.G. in obstetrics.

Apply, giving age and details of qualifications and previous posts with testimonials or names of 2 referees, to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, not later than 5th December, 1957.

FOREST GATE HOSPITAL, Forest-lane, E.7. Senior OBSTETRIC HOUSE OFFICER required for 1 year. The appointment is recognised for training candidates for M.R.C.O.G. and D.Obst.R.C.O.G.

Applications, with names of 2 referees, to the Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 30th November.

GROUP PATHOLOGICAL LABORATORY AT ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. SENIOR HOUSE OFFICER (pathology) for duty in first instance at the Group Laboratory. Post vacant immediately. Post resident or non-resident, with training in 4 branches of pathology.

Applications by 29th November, 1957, on forms obtainable from Hospital Secretary. (L.107.)

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. 2 RESIDENT HOUSE SURGEONS (radiotherapy) required 1st January. These 2 posts offer opportunities for attending general surgical postgraduate teaching.

Applications stating age, qualifications, experience, copies 2 recent testimonials, to Secretary, Board of Governors, by 2nd December, 1957.

HAMPSTEAD GENERAL HOSPITAL, Haverstock Hill, N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited for the pre-registration post of NON-RESIDENT CASUALTY OFFICER (medical or surgical). Vacant 1st January, 1958, tenable for a period of 6 months.

Application forms may be obtained from the Secretary, to whom they should be returned, together with copies of 3 recent testimonials, by 5th December, 1957.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from pre-registration or registered medical practitioners (Male) for the appointment of HOUSE PHYSICIAN to become vacant on Wednesday, 1st January, 1958. Appointment will be for a period of 6 months. National Health Service salary.

Applications to reach the Secretary on or before Monday, 2nd December, 1957, together with copies of 3 recent testimonials.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21. HOUSE SURGEON, vacant 10th December. 50 surgical beds, new operating theatre, Outpatient and Casualty Department. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21. HOUSE PHYSICIAN, vacant 8th December, 1957. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited for appointment as CASUALTY OFFICER (Senior House Officer). Vacant 1st January, 1958. Post recognised for F.R.C.S. Successful candidate will be required to do locum duties from 25th December, 1957.

Forms of application from the Secretary.

MIDDLESEX HOSPITAL, W.1. Applications invited for post of OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR. Duties at The Middlesex Hospital and The Hospital for Women, Soho.

Rules and application forms obtainable from Deputy Superintendent, should be returned, naming 2 referees, by 7th December.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of SENIOR RESIDENT HOUSE PHYSICIAN at The National Hospital, Queen-square, W.C.1, to commence 1st February, 1958. This post carries the grade of Registrar. The appointment will be for 1 year and will be renewed in exceptional circumstances.

Applications, with names of 3 referees, to be sent to the undersigned not later than 29th November, 1957.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, W.C.1.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of NON-RESIDENT HOUSE PHYSICIAN at The National Hospital, Queen-square, W.C.1, to commence 1st February, 1958. There are 2 vacancies. These posts carry the grade of Senior House Officer. The appointments will be for 6 months.

Applications, with names of 3 referees, to be sent to the undersigned not later than 29th November, 1957.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, W.C.1.

NORTH MIDDLESEX HOSPITAL, London, N.18. Applications are invited for the appointment of Locum SENIOR REGISTRAR in Obstetrics and Gynæcology, for the period 16th December, 1957, to 31st March, 1958. Non-resident post, but residence may be arranged if desired. Candidates should possess M.R.C.O.G. Department consists of 140 obstetric beds (including maternity annexe at Finchley) and 60 gynæcological beds. Duties include a certain amount of teaching.

Applications, giving full particulars of qualifications and experience, and names of 2 referees, to Hospital Secretary.

NORTH MIDDLESEX HOSPITAL, London, N.18. Applications are invited for the post of resident HOUSE PHYSICIAN (general medicine). 6 months' appointment, starting on 1st January, 1958. Approved pre-registration post (first or second).

Applications, giving full particulars, together with copies of recent testimonials, should reach the Secretary of the Hospital by 27th November.

NORTH MIDDLESEX HOSPITAL, London, N.18. Applications are invited from pre- and post-registration candidates for the posts (2) of RESIDENT HOUSE SURGEONS (general, with some genito-urinary surgery). 6 months' appointments, vacant 1st January, 1958. Both posts recognised for F.R.C.S.

Applications, giving full particulars, together with copies of recent testimonials, should reach the Secretary of the Hospital by 27th November.

NORTH MIDDLESEX HOSPITAL, London, N.18. Applications are invited for the post of ADMISSIONS OFFICER (Senior House Officer grade). 6 months' appointment; non-resident; vacant 1st January, 1958. This is a busy post in a new department. The evenings and weekends (from 1 P.M. Saturday) are free.

Applications, giving full particulars, with copies of recent testimonials and/or names of 2 referees, should reach the Secretary of the Hospital not later than 27th November.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in General Medicine to fill a vacancy in the approved trainee establishment at the Greenwich and Deptford Group of hospitals, for duties mainly at the Miller General Hospital, Greenwich High-road, S.E.10. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 7th December, 1957.

PRINCESS BEATRICE HOSPITAL, Earls Court, S.W.5. Applications are invited for the post of RESIDENT SENIOR HOUSE PHYSICIAN (Senior House Officer grade) for 6 months. Post vacant end December. Opportunity to serve for a further 6 months as Obstetric/Gynæcological House Surgeon or Casualty/Anæsthetics Officer in the same grade.

Applications, stating age, qualifications, &c., to the House Governor, with 3 testimonials, not later than 6th December, 1957.

PUTNEY HOSPITAL, Lower Common, S.W.15. House PHYSICIAN (resident), male or female, with some gynæcological duties. Vacant 1st January, 1958. Open to pre-registration candidates.

Apply Hospital Secretary not later than 3rd December, 1957, enclosing copies of 3 recent testimonials.

ROYAL FREE HOSPITAL AND NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time appointment of SENIOR REGISTRAR in Psychiatry with 6 sessions at the Royal Free Hospital, Gray's Inn-road, London, W.C.1, and 5 sessions at the Friern Hospital, New Southgate, London, N.11.

Applications, stating age, qualifications and experience, together with the names and addresses of 3 referees, to the Secretary to the Board, Royal Free Hospital, Gray's Inn-road, W.C.1, by 29th November, 1957.

ROYAL FREE HOSPITAL. Applications are invited from registered medical practitioners for the post of SENIOR CASUALTY OFFICER at the Royal Free Hospital, Gray's Inn-road, W.C.1. The appointment is full-time, resident for 6 months, duties to commence 1st January, 1958. Salary and conditions of service in accordance with the scale laid down by the Ministry of Health for Senior Health Officers.

Application forms may be obtained from the Hospital Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 28th November, 1957.

ROYAL FREE HOSPITAL. Department of Physical MEDICINE AND RHEUMATOLOGY. Applications are invited from registered medical practitioners for the appointment of REGISTRAR to the above Department. The appointment is full-time, non-resident and for 1 year in the first instance. Duties to commence on 1st February, 1958. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Application forms may be obtained from the Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 13th December, 1957.

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the post of HOUSE SURGEON in the grade of Senior House Officer to the Surgical Unit at St. George's Hospital. Duties of this post will include work with the general surgical unit and in thoracic surgery. The successful candidate will be required to take up duty as soon as possible in December, 1957.

Applications, stating age, education, qualifications, experience, and the names of 2 referees, should reach the undersigned not later than 2nd December, 1957.

P. H. CONSTABLE, House Officer.

ST. JAMES' HOSPITAL, Balham, London, S.W.12. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Part-time REGISTRAR (7 sessions per week) required for Ophthalmic Unit (18–20 Beds and Outpatient Clinics). Resident or non-resident. Immediate vacancy on account of illness.

Application forms obtainable from Group Secretary, Wandsworth Hospital Group, at above address.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. Applications are invited from registered or provisionally registered medical practitioners for the following posts :—

HOUSE PHYSICIAN
HOUSE SURGEON

Applications, with 2 recent testimonials, to Hospital Secretary.

ST. MARY'S HOSPITAL FOR WOMEN AND CHILDREN, Upper-road, Plaistow, London, E.13. HOUSE SURGEON (pre-registration, first or second post) to commence on 1st January, 1958. Duties include general surgery, gynæcology and E.N.T.

Apply to Hospital Secretary not later than 30th November, 1957.

ST. MARY'S HOSPITAL, Paddington, W.2. Casualty SURGEON (non-resident) required for a first period of 6 months with effect from 1st January, 1958. Remuneration to be at Senior House Officer rates. Candidates must have held an appointment as House Surgeon at this Hospital or at another hospital approved by the Board of Governors.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 3rd December, 1957.

ST. MARY'S HOSPITAL, W.2. Resident Anæsthetist required with effect from 1st January, 1958. The appointment is for a first period of 6 months; remuneration to be at Senior House Officer rates.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 30th November, 1957.

ST. THOMAS'S HOSPITAL, London, S.E.1. Registrar to the E.N.T. Department for 1 year in the first instance from 3rd March, 1958.

Applications, naming 2 referees, to Clerk of the Governors by 4th December, 1957.

WANSTEAD HOSPITAL, Harmon Hill, E.11. (191 Beds.) Applications are invited for the post of OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON, vacant 9th December, 1957. The appointment is recognised for the D.Obst.R.C.O.G.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WANSTEAD HOSPITAL, Harmon Hill, London, E.11. (191 Beds.) HOUSE SURGEON required, post vacant 24th December, 1957. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

SOUTH WESTERN HOSPITAL, Landor-road, S.W.9. HOUSE PHYSICIAN (registered or pre-registration) required at the above Hospital. Combined tuberculosis and acute medicine. Post vacant 22nd December, 1957.

Form of application from the Secretary, to be returned by 7th December, 1957.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. SENIOR HOUSE OFFICER (Casualty Department). Vacant 27th November. Recognised for F.R.C.S. 6-month resident appointment and may then be renewed for a further period.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

WHITTINGTON HOSPITAL, London, N.19. Applications are invited for the following appointments:—

*HOUSE PHYSICIAN (general medicine). 4 posts recognised for M.D.(Lond.).

†HOUSE SURGEON (general surgery). 4 posts recognised for F.R.C.S.(Lond.).

HOUSE SURGEON (obstetrics). Post recognised for M.R.C.O.G. in Obstetrics.

*HOUSE PHYSICIAN (paediatrics). Post recognised for M.D.(Lond.) and D.C.H.

SENIOR HOUSE OFFICER (geriatrics).

SENIOR HOUSE OFFICER (general medicine).

All posts vacant 1st January, 1958.

*Pre-registration candidates who have already held a first appointment may apply.

†Pre-registration candidates may apply.

Application forms obtainable from Group Secretary, 46, Cholmeley-park, London, N.6 (ARChway 3070, Ext. 527) and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 2nd December, 1957.

WIMBLEDON HOSPITAL, Thurstan-road, Copse Hill, S.W.20. RESIDENT HOUSE SURGEON (not pre-registration). Vacant now. Salary £577 10s. p.a. Post affords good opportunity for postgraduate training and offers excellent experience in surgery.

Applications, giving age, qualifications, &c., and names and addresses of 2 referees, to the Secretary at above address.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIANS. 5 posts vacant 1st January, 3 at Brook General Hospital, Woolwich, 2 at St. Nicholas Hospital, Plumstead. All posts approved for pre-registration service.

Applications to Group Secretary, Memorial Hospital, Woolwich, S.E.18, not later than 30th November.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEONS. 5 posts vacant 1st January, 3 at Memorial Hospital, Woolwich, 2 at St. Nicholas Hospital, Plumstead. All recognised for F.R.C.S., and approved for pre-registration service.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pathology). Vacant 1st January. The appointment is to the Group laboratories and is for 1 year. Salary £819 10s. p.a., less £150 p.a. if resident.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ALTON GENERAL HOSPITAL, Alton. (136 Beds—Acute general.) RESIDENT HOUSE OFFICER required for general surgical duties. Post suitable for pre-registration candidates. Vacant early December, 1957. Recognised for F.R.C.S. 6-month appointment.

Applications and copies of testimonials to be sent to the Hospital Secretary by 3rd December.

ALTRINCHAM GENERAL HOSPITAL. Assistant Senior SURGICAL OFFICER (Junior Hospital Medical Officer grade). Applications are invited for this post in a Hospital of 130 acute beds with a busy Casualty Department. The appointee would be required to exercise control of this Department and also to assist Resident Surgical Officer with the general surgical work of the Hospital. The post offers excellent opportunities of practical experience and postgraduate study to suitably qualified candidates and particularly those studying for higher surgical qualifications.

Applications, with names of 2 referees, to Group Secretary, North and Mid-Cheshire Hospital Management Committee, Sinderland-road, Altrincham, Cheshire.

ALTRINCHAM GENERAL HOSPITAL. St. Anne's E.N.T. DEPARTMENT, ALTRINCHAM, CHESHIRE. (53 Beds.) REGISTRAR required (preferably resident). Vacant January, 1958. This post offers excellent opportunities of practical experience and is recognised under F.R.C.S. regulations.

Applications to be forwarded, with names of 2 referees, to the Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

ALTRINCHAM GENERAL HOSPITAL AND ANNEXE. (130 Beds.) Applications are invited for the pre-registration post of JUNIOR HOUSE OFFICER (surgical).

Applications to Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

ALTRINCHAM GENERAL HOSPITAL AND ANNEXE. (130 Beds.) Applications are invited for the pre-registration post of JUNIOR HOUSE OFFICER (medical), vacant February, 1958.

Applications to Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE SURGEON (pre-registration); vacant now. The Hospital serves a wide area of pleasant countryside and the post affords good opportunity to study excellent clinical material.

Apply to Group Secretary, 19, Alexandra-road, Barnstaple.

BARNSTAPLE. NORTH DEVON INFIRMARY (Central Group Hospital of 105 Beds). SENIOR HOUSE SURGEON. Post vacant 13th January, 1958, for 1 year. Salary £819 10s. p.a. Furnished flat available for rental.

Applications, with customary details, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

ALEXANDRIA, DUNBARTONSHIRE. VALE OF LEVEN HOSPITAL. (156 Beds.) BOARD OF MANAGEMENT FOR DUNBARTONSHIRE HOSPITALS. Applications are invited for the post of RESIDENT HOUSE PHYSICIAN at the above new Hospital for the period 1st February to 31st July, 1958. The post is recognised for pre-registration purposes.

Applications should be addressed to the Medical Superintendent at the Hospital.

BEDFORD GENERAL HOSPITAL. (436 Beds.) 2 House SURGEONS required. Pre- or post-registration; recognised for F.R.C.S. One vacant now, one end of November. Posts offer exceptional opportunities for general experience in busy acute surgical units.

Inquiries and applications, with copies of 2 recent testimonials, to be sent immediately to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (436 Beds.) 2 Resi-DENT HOUSE PHYSICIANS (pre-registration) required end November.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (436 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required for busy acute Orthopædic and Traumatic Department at above Hospital. Previous orthopædic experience desirable. Candidates may visit the Hospital by appointment with the Group Secretary.

Application forms obtainable from and returnable to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by 9th December, 1957.

BEDFORD GENERAL HOSPITAL. (436 Beds.) Ortho-PÆDIC HOUSE SURGEON required. Vacant now. Pre- or post-registration; recognised for F.R.C.S. Post offers wide experience in a busy specialist orthopædic and traumatic unit.

Inquiries and applications, with copies of 2 recent testimonials, to be sent immediately to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) HOUSE PHYSICIAN (House Officer or Senior House Officer grading according to experience).

Apply Group Secretary.

BIRMINGHAM ACCIDENT HOSPITAL, Bath-row, BIRMINGHAM, 15. (215 Beds and 8 House Surgeons.) HOUSE SURGEONS (resident). Vacant January/February. Hospital largest traumatic unit in country and treats over 50,000 new patients each year. Recognised for purpose of casualty by R.C.S. (Eng.). Teaching programme by consultant staff. 6-month appointment, some of which may be spent in 42-Bedded Medical Research Council's Burns Unit.

Apply, naming 2 referees, to Administrator.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (780 Beds.) HOUSE PHYSICIAN (general medicine). Recognised for pre-registration. Vacant 13th January, 1958. Responsible for approximately 80 Male and Female adult medical beds in unit under 2 Consultant Physicians.

Applications, enclosing copies of 2 recent testimonials, to Group Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

1. Dudley Stourbridge Group. The Guest Hospital, Dudley

REGISTRAR (general surgery) for The Guest Hospital, Dudley. (154 Beds.) Experience specialty essential. Higher qualification desirable. Resident. Married accommodation available.

2. Mid-Worcestershire Group, Birmingham-road, Bromsgrove

REGISTRAR (general surgery), whole-time for Kidderminster and District General Hospital. Experience specialty essential. Post recognised for F.R.C.S.

3. Herefordshire Group, Victoria House, Eign-street, Hereford

REGISTRAR (general surgery). Duties mainly at General (154 Beds—71 surgical beds, including fracture and orthopædic) and County Hospitals, Hereford (399 Beds—40 surgical). Recognised for F.R.C.S.

4. Birmingham (Selly Oak) Group, Oak Tree-lane, Birmingham, 29

(*a*) REGISTRAR (surgical) for Birmingham Accident Hospital, Bath-row, Birmingham, 15 (215 Beds). Duties with Accident Surgery Team and possibility of transfer to Burns Unit. General surgical experience essential. Higher qualification an advantage.

(*b*) REGISTRAR (anæsthetist), resident, for Birmingham Accident Hospital, Bath-row, Birmingham, 15 (215 Beds), now vacant. Recognised D.A. and F.F.A. R.C.S. (6 months). Ample opportunity for study.

Application forms from Group Secretaries, to be returned by 2nd December, 1957.

BIRMINGHAM REGIONAL HOSPITAL BOARD AND UNITED BIRMINGHAM HOSPITALS. Whole-time SENIOR REGISTRAR in Radiodiagnosis. Duties at Coventry and Warwickshire Hospital and other hospitals in the Coventry Group (9 notional half-days) and United Birmingham Hospital (2 notional half-days). D.M.R.D. essential. Non-resident.

Application forms from Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, to be returned by 9th December, 1957.

BIRMINGHAM, 9. LITTLE BROMWICH GENERAL HOSPITAL. RESIDENT MEDICAL OFFICER in Infectious Diseases (Senior House Officer grade). Hospital serves a wide area and gives opportunity for the study of infectious diseases, and has a poliomyelitis respiratory unit. Part of the hospital is being developed as a general hospital, where further experience can be gained.

Apply, Physician-Superintendent with 2 testimonials.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the post of RESIDENT MEDICAL OFFICER, second of 2 (Senior House Officer grade), vacant 1st January, 1958, for 1 year. Main duty to take charge of Infants Block (66 Cots). Valuable opportunity for further study of disease of infancy, some previous experience of which is desirable. M.R.C.P. preferred.

Forms of application available from the House Governor and should be returned to him by 30th November, 1957.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. HOUSE OFFICERS (surgical) required to commence duty on 7th January, 1958, for 6 months. The posts rotate during the period giving good experience of general and special surgery. Recognised for pre-registration students, but registered practitioners may apply.

Forms of application available from the House Governor, and should be returned to him by 7th December, 1957.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM. UNITED BIRMINGHAM HOSPITALS. Applications are invited as follows :—

RESIDENT GYNÆCOLOGICAL HOUSE SURGEON for duty at the Women's Hospital, Sparkhill.

RESIDENT OBSTETRICAL HOUSE SURGEON for duty at the Maternity Hospital, Loveday-street.

The posts are recognised for the D.Obst.R.C.O.G. and M.R.C.O.G.

Application forms obtainable from the House Governor, Birmingham and Midland Hospitals for Women, Showell Green-lane, Birmingham, 11, to be returned not later than 30th November, 1957.

BIRMINGHAM (near). MARSTON GREEN MATERNITY HOSPITAL, Berwicks-lane, MARSTON GREEN, near BIRMINGHAM. HOUSE SURGEON (obstetrics) required. Vacant 1st January, 1958. 121 obstetric and 10 gynæcological beds. Recognised for diploma and obstetric part of M.R.C.O.G. Premature Baby Unit. Hospital affiliated to Birmingham Medical School for training of students.

Detailed applications, with copies of 3 recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. Senior HOUSE OFFICER (resident) E.N.T. Department (42 Beds).

Applications, giving age, qualifications and experience, to the Medical Superintendent.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. HOUSE OFFICER (obstetrics and gynæcology). Applications invited from registered or pre-registration practitioners. Vacant 1st January, 1958. Recognised for D.Obst. R.C.O.G. Departmental beds 69.

Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee at above address.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Royal Infirmary, Blackburn

HOUSE SURGEONS (2) required for 25th January and 1st February, 1958. Posts recognised for F.R.C.S. and approved for pre-registration purposes.

HOUSE PHYSICIAN required for 23rd January, 1958. Post recognised for pre-registration purposes.

Queen's Park Hospital, Blackburn

HOUSE SURGEON required for 1st February, 1958. Post recognised for F.R.C.S. and approved for pre-registration purposes.

HOUSE PHYSICIANS (2) required for 1st February and 22nd February, 1958. Posts recognised for pre-registration purposes.

Victoria Hospital, Accrington

HOUSE PHYSICIAN required for 22nd January, 1958. Post recognised for pre-registration purposes.

Apply to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKBURN. ROYAL INFIRMARY. (262 general beds.) BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER (casualty and orthopædics) required immediately. Junior Hospital Medical Officer post can be for any period up to 4 years. Recognised for F.R.C.S.

Apply to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pædiatrics) required 2nd January, 1958. Post recognised for D.C.H. and duties as laid down by Consultant Pædiatrician at Queen's Park Hospital and Royal Infirmary, Blackburn, Victoria Hospital, Accrington (general hospitals) and Park Lee Hospital, Blackburn (infectious diseases hospital).

Apply to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, WESTBOURNE. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (resident), vacant 20th December, 1957, for E.N.T. duties. The appointment is recognised for the D.L.O. diploma and facilities are provided for studying.

Applications to the Hospital Secretary, Royal Victoria Hospital, Shelley-road, Bournemouth.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. GENERAL HOUSE SURGEON (pre-registration intern) required for post vacant on 14th December. Appointment recognised for F.R.C.S. examination.

Applications to the Hospital Secretary.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Group Laboratories

RESIDENT PATHOLOGIST (Senior House Officer grade). Now vacant, tenable for 12 months and recognised for the Dip. Path.

Bolton District General Hospital (607 Beds)

RESIDENT SENIOR HOUSE OFFICER in Medicine. Vacant 1st December and tenable for 12 months.

RESIDENT HOUSE PHYSICIAN. Now vacant, tenable for 6 months and recognised under the pre-registration service scheme.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BRIDGEND GENERAL HOSPITAL, Quarella-road, BRIDGEND. (381 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (E.N.T.).

Applications, naming 2 referees, to be addressed to the Group Secretary of the Mid-Glamorgan Hospital Management Committee, 8, Wind-street, Neath.

BRIDGEND GENERAL HOSPITAL, Quarella-road, BRIDGEND. (381 Beds.) MID GLAMORGAN MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics). This hospital is recognised for the examinations of the F.A.R.C.S.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, 8, Wind-street, Neath.

BRISTOL MENTAL HOSPITAL MANAGEMENT COMMITTEE. BARROW AND FISHPONDS HOSPITALS. Applications invited from registered practitioners for appointment of SENIOR HOUSE OFFICER. National scales and conditions. The Group includes modern admission units, neurosis centre and day Hospital, with departments of applied psychology and electroencephalography. The appointment offers opportunities for experience in many aspects of acute and chronic illness. Facilities available for studying and gaining experience for Diploma in Psychological Medicine and for attending courses at Bristol University in preparation for this examination. Full board residence available for single officer.

Applications, with names of 3 referees, should be sent to Medical Superintendent, Barrow Hospital, Barrow Gurney, near Bristol.

BRISTOL. SOUTHMEAD GENERAL HOSPITAL GROUP MANAGEMENT COMMITTEE. Applications are invited for the following appointments which will become vacant on 1st February, 1958 :—

Southmead Hospital, Bristol (570 Beds including 138 maternity)

1 SENIOR HOUSE OFFICER (casualty) (will also have duties as E.N.T. House Surgeon). Post recognised for F.R.C.S. examination.

1 HOUSE OFFICER (casualty) (will also have duties as E.N.T. House Surgeon). Post recognised for F.R.C.S. examination.

3 HOUSE SURGEONS. Posts recognised for F.R.C.S. examination.

4 HOUSE PHYSICIANS.

1 HOUSE SURGEON (gynæcology). Post recognised for M.R.C.O.G. examination.

3 HOUSE OFFICERS (obstetrics). Post recognised for M.R.C.O.G. examination.

2 HOUSE PHYSICIANS (Pædiatrics). Posts recognised for D.C.H.

Mortimer House Maternity Hospital, Clifton, Bristol (35 Beds)

1 SENIOR HOUSE OFFICER (obstetrics).

Applications are also invited for 1 HOUSE OFFICER (obstetrics) at Southmead Hospital for 6 months commencing 1st May, 1958 ; 1 SENIOR HOUSE OFFICER (urology) at Southmead Hospital from 15th March, 1958 (post recognised for F.R.C.S. examination) ; and 1 SENIOR HOUSE OFFICER (medical) at Snowdon Road Hospital, Fishponds, Bristol (300 Beds—chronic sick, general medical, and dermatological cases), from 18th March, 1958.

Applications, on forms to be obtained from the undersigned, to be returned not later than the 3rd December, 1957.

C. C. HANCOCK, Group Secretary.

Southmead Hospital, Bristol.

BRISTOL (near). HAM GREEN HOSPITAL, Pill, near BRISTOL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in the Chest Diseases wards of the above Hospital. The Hospital is fully equipped for modern treatment of pulmonary tuberculosis and other diseases of the chest, including regular major thoracic surgery. Opportunity also for work in the Bristol Chest Clinic. Appointment for 1 year, renewable. Post now vacant.

Applications, with testimonials and names of referees, to the Secretary, Ham Green Hospital, Pill, near Bristol.

CASTLEFORD, NORMANTON AND DISTRICT HOSPITAL, HIGHTOWN, CASTLEFORD. RESIDENT SURGICAL OFFICER (Senior House Officer grade) required. Married accommodation available. Post vacant early December.

Applications as soon as possible to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter-row, Pontefract, Yorkshire.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Surgical REGISTRAR (non-resident) for 1 year in first instance from early January, renewable for second year.

Apply, with full particulars and names of 3 referees, to Secretary by 7th December.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. REGISTRAR (medical and infectious diseases) at Brookfields Hospital, Cambridge (residence available). This hospital has 2 wards for infectious diseases, 1 for general medicine and 1 for tuberculosis and is the Poliomyelitis Centre for the south-west section of East Anglia. Appointment for 1 year in first instance, renewable for a second year.

Apply, with full particulars and names of 3 referees, to Secretary, Addenbrooke's Hospital, Cambridge, by 7th December, 1957.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. ADDENBROOKE'S HOSPITAL. CLINICAL ASSISTANT (part-time) in the Urological Outpatient Department for 2 notional half-days per week on Wednesday mornings and Friday afternoons. The appointment will be subject to review annually. Salary £183 15s. p.a. per notional half-day.

Applications, stating age, qualifications and experience, with names of 2 referees, to the Secretary, Addenbrooke's Hospital, by 30th November.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months' appointment. Post vacant early in December, 1957. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARDIFF. ROYAL HAMADRYAD GENERAL AND SEAMEN'S HOSPITAL. CARDIFF HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER (medical) required at above Hospital, which caters for acute general medical and surgical cases. Hospital contains acute medical unit, general surgical and genitourinary units and outpatient facilities, also certain amount of casualty work. Consultant staff drawn mostly from United Cardiff Hospitals. Post for 1 year and presents facilities for postgraduate study.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON. Pre-registration post. The post will become vacant during the middle of November, and offers good surgical experience. Recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CLACTON AND DISTRICT HOSPITAL, Clacton-on-Sea. (58 Beds.) Applications invited for post of SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

DENBIGH (near). LLANGWYFAN HOSPITAL. (370 Beds. Pulmonary and non-pulmonary tuberculosis. Hospital contains a major thoracic surgery unit, genitourinary unit, orthopædic unit and children's unit.) SENIOR HOUSE OFFICER (Male or Female) required at the above Hospital. Post vacant on 15th January, 1958.

Applications, with copies of 2 recent testimonials, to be sent forthwith to Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl.

DEWSBURY. STAINCLIFFE GENERAL HOSPITAL. (304 Beds.) Applications are invited for the post of RESIDENT SURGICAL OFFICER (Senior House Officer grade) which falls vacant on 14th January, 1958. The Hospital has a general surgical unit of 52 Beds and is recognised for the F.R.C.S.

Applications, with full details, to the Administrative Officer at the Hospital.

DEWSBURY, YORKSHIRE. THE GENERAL HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgery and E.N.T.). The appointment is recognised for pre-registration.

Applications, stating age and experience, and giving names and addresses of 2 referees, to the Administrative Officer at the Hospital.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)

HOUSE OFFICER (medical), pre-registration. Post vacant 1st January, 1958.

Apply Group Secretary, Guest Hospital, Dudley, Worcs.

SENIOR HOUSE OFFICER (anæsthetics). Post recognised for D.A. Successful candidate will be required to visit other hospitals in the Group.

Applications, giving the names of 2 referees, to the Group Secretary, Guest Hospital, Dudley, Worcs.

SENIOR HOUSE OFFICER (surgical). Post vacant November, 1957.

HOUSE OFFICER (surgical), pre-registration. Post vacant now.

Apply Group Secretary, Guest Hospital, Dudley, Worcs.

The Corbett Hospital, Stourbridge (114 Beds)

HOUSE OFFICER (surgical), pre-registration. Post vacant January, 1958.

Apply Group Secretary, Guest Hospital, Dudley, Worcs.

DUNDEE. WESTGREEN MENTAL HOSPITAL. (660 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required. Teaching school for Queen's College, St. Andrew's University. National salary scale. House available to rent. Some experience in psychiatry and an interest in insulin therapy would be assets.

Applications, stating age, nationality, qualifications and experience, with recent testimonials, to Physician-Superintendent.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. (86 Beds.) SENIOR HOUSE OFFICER (pædiatrics) required. Vacant 16th January, 1958. Recognised for D.C.H.

Applications, with 2 names for reference, should be sent as soon as possible to Hospital Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SENIOR HOUSE OFFICER (general medicine) vacant early January.

Applications, headed Post 2, stating full details and 2 names for reference, should be sent immediately to the Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SENIOR HOUSE OFFICER (general surgery) or HOUSE SURGEON (pre-registration) vacant mid-January. Recognised for F.R.C.S.

Applications, headed Post 1, stating full details and 2 names for reference, should be sent immediately to the Secretary.

DARLINGTON MEMORIAL HOSPITAL. Applications are invited from Male or Female practitioners for the post of SURGICAL AND CASUALTY OFFICER (Senior House Officer) which is recognised for the F.R.C.S. (Eng.). Salary £819 10s. p.a., deduction of £150 p.a. for full residential emoluments. The post is tenable for 12 months, or for a shorter period if desired. The successful candidate will work in conjunction with a Senior Casualty Officer.

Apply, with references, stating age and experience, to the undersigned. G. W. BECKWITH,

Group Secretary and Secretary-Superintendent.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR, Ipswich and East Suffolk Hospital. Single quarters available. Appointment for 1 year, renewable for second year.

Applications, stating age, experience, and the name of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 2nd December, 1957. Candidates invited to visit the hospital by direct arrangement with Hospital Management Committee Secretary, Ipswich and East Suffolk Hospital, Anglesea Road Wing, Ipswich.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. RESIDENT HOUSE PHYSICIAN for above Hospital. Post vacant 15th December, 1957. 6 months' appointment. Post recognised for pre-registration purposes.

Applications, stating age, qualifications, experience and enclosing copies of up to three recent testimonials, to Medical Director of Hospital by 29th November, 1957.

EDINBURGH. PRINCESS MARGARET ROSE ORTHOPÆDIC HOSPITAL. Applications are invited from registered medical practitioners for appointments commencing 1st December, 1957, as SENIOR HOUSE OFFICERS (resident) in the above Hospital (222 child and adult beds). National Health Service scale.

Applications, stating age, qualifications and experience, and names of 2 referees, to be sent immediately to the Secretary, Edinburgh Central Hospitals Board, 1, Rillbank-terrace, Edinburgh, 9.

EPPING. ST. MARGARET'S HOSPITAL. House PHYSICIAN (pre-registration) to Consultant in General Medicine. Post vacant 15th January, 1958.

Applications, with copies of testimonials, 1 from medical school, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex, by 6th December, 1957.

EPPING. ST. MARGARET'S HOSPITAL. House Surgeon (pre- or post-registration) to very busy General Surgical Unit. Hospital within easy reach of Central London. Post vacant 15th January, 1958.

Applications, with copies of testimonials, including 1 from medical school, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex, by 6th December, 1957.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 11th December. Pre-registration post recognised for F.R.C.S.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary at above address.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from registered medical practitioners (Male and Female) for the appointment of SENIOR HOUSE OFFICER in Clinical Pathology (resident). Vacant late January 1958. The successful candidate will be responsible for emergency pathological and blood-transfusion duties, and will receive training in the different branches of clinical pathology.

Applications, with names of 2 referees, to the Hospital Secretary by 7th December, 1957.

GLASGOW NORTHERN HOSPITALS. BOARD OF MANAGEMENT. Applications are invited for the post of SENIOR HOUSE OFFICER in Pathology and Hæmatology at Stobhill General Hospital, Glasgow. The appointment will be for 1 year in the first instance.

Applications, stating age, qualifications, experience and present appointment, and naming 2 referees, to be lodged with the Secretary, 13, Woodside-place, Glasgow, C.3, by 30th November, 1957.

GLASGOW ROYAL INFIRMARY. Senior House Officer in Radiology. Duties at above Infirmary.

Write, giving 3 names for reference, not later than Saturday, 30th November, 1957, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GRANTHAM AND KESTEVEN GENERAL HOSPITAL. (118 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. SECOND RESIDENT SURGICAL OFFICER with duties in Orthopædics, Gynæcology, E.N.T. and relief duties for Resident Surgical Officer required immediately. (Registrar rate of pay.) Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 2nd December, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

GREENOCK. GATESIDE INFECTIOUS DISEASES HOSPITAL. BOARD OF MANAGEMENT FOR GREENOCK AND DISTRICT HOSPITALS. Applications are invited from suitably qualified medical practitioners for the appointments of RESIDENT JUNIOR HOSPITAL MEDICAL OFFICERS. Good experience offered in the diagnosis and treatment of infectious diseases, including venereal diseases. Well equipped Clinical Laboratory. The appointments will be subject to the National Health Service (Scotland) (superannuation) regulations.

Applications, giving details of age, experience, and qualifications, together with copies of 3 recent testimonials or names of referees, should be forwarded to the Group Secretary and Treasurer, 47, Eldon-street, Greenock, within 14 days from date of insertion.

HALIFAX. NORTHOWRAM HALL HOSPITAL. (108 Beds.) SENIOR HOUSE OFFICER in Chest Diseases required. Post vacant December, 1957. Duties include attendance at busy Chest Clinic at the Royal Halifax Infirmary and non-tuberculosis chest ward work. This post offers excellent facilities for a study of chest diseases and experience is available with bronchoscopies and bronchograms. Salary £819 10s. p.a., with a deduction of £150 p.a. for board residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) SENIOR HOUSE OFFICER in casualty and orthopædic surgery required. Post recognised for F.R.C.S. and is vacant 1st January, 1958. Salary £819 10s. p.a., with deduction of £150 p.a. for board residence, &c.

Apply to Group Secretary, Royal Halifax Infirmary, Halifax.

HAREFIELD HOSPITAL, Harefield, Middlesex. Applications are invited for the pre-registration post of HOUSE SURGEON to the general wards at the above Hospital. Vacant immediately.

Applications, with copies of 2 testimonials, to the Medical Director of the Hospital.

HAREFIELD HOSPITAL, Harefield, Middlesex. Applications are invited for the pre-registration post of HOUSE PHYSICIAN to the general wards at the above Hospital. Vacant 1st December, 1957.

Applications, with copies of 2 testimonials, to the Medical Director of the Hospital.

HASLEMERE AND DISTRICT HOSPITAL, Haslemere. GUILDFORD GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SURGICAL REGISTRAR (general). Unfurnished house available. Candidates may visit the hospital by arrangement.

Application forms obtainable from, and should be returned to, Group Secretary, Guildford Group Hospital Management Committee, St. Luke's Hospital, Guildford, by 7th December, 1957.

HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.) HOUSE PHYSICIAN required. Pre-registration post vacant 16th December. 4 residents on staff.

Applications to be sent by 30th November, 1957, to Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) Applications are invited for the post of HOUSE SURGEON (pre-registration), vacant on 30th November, 1957. This Hospital is the main surgical hospital in the Hastings area and the post offers excellent experience.

Apply immediately, with 2 testimonials or names of 2 referees, to the Administrator of the Hospital.

HAYWARDS HEATH. HURSTWOOD PARK HOSPITAL. SENIOR HOUSE OFFICER (neurology), resident, required at the above Hospital. Accommodation for married man. Salary in accordance with the terms and conditions of service with appropriate deduction for residence.

Applications, with the names and addresses of 3 referees, to the Secretary to the Hospital Management Committee, St. Francis Hospital, Haywards Heath, Sussex.

HEMEL HEMPSTEAD. WEST HERTS HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required at above Hospital. New post. Application made for recognition by Faculty.

Application forms obtainable from and returnable to Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by 10th December, 1957.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. (621 Beds.) PÆDIATRIC REGISTRAR—previous pædiatric experience essential. Duties include experience in children's medical ward, neonatal unit, and pædiatric outpatient clinics. Unit recognised for D.C.H. Post vacant end January. Candidates may visit hospital by direct appointment.

Application forms obtainable from and returnable to Group Secretary, Uxbridge Group Hospital Management Committee, The Furze, Pield Heath-road, Hillingdon, Middlesex, by 7th December.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of RESIDENT CASUALTY OFFICER (Senior House Officer grade) with attachment to Pædiatrician and Ophthalmic Consultant. Salary £819 10s. p.a., less £150 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence 9th December, 1957.

Apply, with full details and references, to Group Secretary, Hertford Hospital Management Committee, County Hospital Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general), first or second post. To commence 27th November, 1957. Pre-registration post, recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general, gynæcology and obstetrics), (first or second post). To commence 13th December, 1957. Pre-registration post ; recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HEREFORD. COUNTY HOSPITAL. (339 Beds.) House OFFICER (medicine) required, vacant 17th December.

Applications, with copies of 2 recent testimonials, to Group Secretary, Hospital Management Committee, Victoria House, Eign-street, Hereford.

HITCHIN HOSPITALS, Hitchin, Hertfordshire. Resident ANÆSTHETIST (Senior House Officer) required 1st January, 1958. Recognised for D.A. and F.F.A.R.C.S. examinations.

Applications, stating age, nationality, qualifications and experience, together with names of 2 referees, to the Medical Administrator, Lister Hospital, Hitchin, by 27th November, 1957.

HITCHIN, HERTFORDSHIRE. LISTER HOSPITAL. RESIDENT HOUSE SURGEON required end of November. Recognised as pre-registration post.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to the Medical Administrator, Lister Hospital, Hitchin, as soon as possible.

HOUNSLOW HOSPITAL, Staines-road, Hounslow, MIDDLESEX. (General acute—81 Beds.) Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN. Recognised pre-registration appointment for 6 months. Vacant 14th December, 1957.

Applications, stating qualifications and age, together with copies of up to 3 recent testimonials or names for reference, to the Hospital Secretary.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD. ST. LUKE'S HOSPITAL. (235 Beds.) Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade) at the above Hospital, to commence duties on 4th December, 1957. The Group Geriatric Admission Unit is based on this Hospital, which also caters for acute medical and surgical, pædiatric and maternity patients. Salary in accordance with the terms and conditions of service for hospital medical and dental staff, £852 10s.–£55–£1182 10s. p.a. House available for married candidate.

Applications, together with copies of 3 recent testimonials, to be sent to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HULL. VICTORIA HOSPITAL FOR SICK CHILDREN, Park-street. Pre-registration or registration post. HOUSE SURGEON required immediately. Recognised for D.C.H. An interesting and varied post which includes outpatient and casualty work.

Applications, together with details of experience, testimonials, &c., to the Hospital Secretary.

HULL A GROUP HOSPITAL MANAGEMENT COM-MITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in the E.N.T. Department of the Victoria Hospital for Sick Children and the Hull Royal Infirmary. The post, which is vacant on 11th December, is recognised for the F.R.C.S. and D.L.O.

Applications, with testimonials, should be sent to the Hospital Secretary, Victoria Hospital for Sick Children, Park-street, Hull.

IPSWICH. FOXHALL HOSPITAL. (102 Beds for chest diseases.) SENIOR HOUSE OFFICER. The Hospital is actively engaged in the investigation and treatment of all forms of chest disease, including major thoracic surgery and a respiratory function unit. House available.

Applications, with copies of recent testimonials, to Physician-Superintendent, from whom further details may be obtained.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. Applications are invited for the approved pre-registration post of HOUSE PHYSICIAN.

Applications, stating age, nationality and experience, together with copies of 3 recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Heath ROAD WING, IPSWICH. (280 Beds.) Applications invited for post of NON-RESIDENT CASUALTY OFFICER (Senior House Officer), vacant immediately. Day-time duties only, offering opportunity of study for higher examinations.

Applications, with full details, to the Hospital Secretary.

KETTERING AND DISTRICT GENERAL HOSPITAL, KETTERING, NORTHANTS. Applications are invited for the undermentioned posts. Vacant 1st December, 1957.

HOUSE SURGEON (pre-registration). Post recognised for F.R.C.S.

HOUSE PHYSICIAN (pre-registration).

Applications, stating age, experience and qualifications, together with copies of 3 recent testimonials, should be sent to the Group Secretary, at above address.

KETTERING DISTRICT GENERAL HOSPITAL. The post of CASUALTY OFFICER (Senior House Officer), recognised for F.R.C.S., is vacant early December, 1957. It offers wide experience of all traumatic conditions, including fractures and some orthopædic cases with charge of 30 Beds.

Applications, accompanied by testimonials, to be sent to the Group Secretary, General Hospital, Rothwell-road, Kettering.

ILKLEY. MIDDLETON HOSPITAL. (430 Beds.) Resident SENIOR HOUSE OFFICER (medical) required at the above Hospital. This appointment provides for experience in the specialties of tuberculosis and geriatrics.

Applications, stating age, nationality, qualifications, and experience, to Hospital Secretary.

IRVINE. AYRSHIRE CENTRAL HOSPITAL. Resident JUNIOR HOSPITAL MEDICAL OFFICER required 1st December, Infectious Diseases Unit. House may be available.

Applications, stating qualifications and experience and giving names of 2 referees, to Area Medical Superintendent, 1, Hill-street, Kilmarnock.

ISLE OF WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for House Surgeon's duties at The Royal I.W. County Hospital and St. Mary's Hospital, Newport, I.W., vacant 29th January, 1958. (Salary £819 10s. p.a.) Post recognised for F.R.C.S.

Applications, with names of 2 referees, to the Hospital Secretary, Royal I.W. County Hospital, Ryde, I.W., by 14th December, 1957.

KENDAL. WESTMORLAND COUNTY HOSPITAL. (82 Beds.) RESIDENT SENIOR HOUSE OFFICER (medical). Duties include the care of acute cases under the supervision of 2 Consultant Physicians, and attendance at consultative clinics. Post vacant 1st December, 1957, and tenable for 1 year.

Applications, with full particulars and names of 2 referees, to be addressed to Group Secretary, Royal Lancaster Infirmary, Lancaster.

KIRKCALDY. VICTORIA HOSPITAL. Junior Hospital MEDICAL OFFICER (non-resident) to work under the Geriatrician. Duties mainly in the Acute Admission Unit (48 Beds); other duties in connection with the Geriatric Service may have to be undertaken at other hospitals in Fife. Salary in accordance with national scale.

Apply, in writing, with names of 2 referees, to the Medical Superintendent, East Fife Hospitals Board of Management, 243A, High-street, Kirkcaldy.

LANCASTER. ROYAL LANCASTER INFIRMARY. (240 Beds.) RESIDENT HOUSE OFFICER (surgical). Pre-registration post. Successful applicant will work with consultant surgical unit and attend consultative clinics. Post tenable for 6 months. Recognised for F.R.C.S.

Applications, with names of 2 referees, to the Secretary, Royal Lancaster Infirmary, Lancaster.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Anæsthetics

Halifax Group. (Approximately 340 Beds in the surgical specialties.) Resident.

General Medicine

Two vacancies in the Hull (A) Group. (294 general medical beds.) Non-resident.

Obstetrics and Gynæcology

York (A) Group. (80 obstetric and 75 gynæcological beds.) Recognised for M.R.C.O.G.

Ophthalmology

Huddersfield Group. (23 eye beds and 1500 new outpatients annually.) Non-resident.

Plastic Surgery

St. James's Hospital, Leeds. Non-resident. Special plastic and Maxillo-Facial unit. (72 Beds.)

Psychiatry

(i) Menston Hospital, near Leeds. (2500 Beds.)

(ii) Oulton Hall Hospital, near Wakefield, and affiliated mental deficiency colonies. (Approximately 400 Beds.) Non-resident.

(iii) Stanley Royd Hospital, Wakefield. (2000 Beds.) Recognised for D.P.M.

(iv) Storthes Hall Hospital, Kirkburton, near Huddersfield. (2750 Beds.)

If desired, facilities for attendance at the Leeds University will be provided, if the successful candidates are studying for the D.P.M.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 27th November, 1957.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. SENIOR REGISTRAR in General Medicine required for 1 year in the first instance from 1st January, 1958. The successful candidates may be required to serve a subsequent period in 1 of the regional hospitals. Terms and conditions of service for hospital medical staffs apply.

Applications, stating age, qualifications, previous posts with dates, and 3 names for reference should be sent to the Sub-Dean, School of Medicine, Leeds, 2, by not later than 5th December, 1957.

LEICESTER (near). CARLTON HAYES HOSPITAL, NARBOROUGH, near LEICESTER. (1070 Beds. Recognised for D.P.M.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR (psychiatry) required immediately. Single accommodation available. Facilities for postgraduate study in conjunction with Sheffield University available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fullwood road, Sheffield, by 2nd December, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a post of REGISTRAR in Pathology for duties at the Women's Hospital to take up duty as soon as possible for the period to 30th September, 1958. Annual re-appointment thereafter until completion of the normal period of training will be considered without need for further application.

Apply by 7th December on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LUTON AND DUNSTABLE HOSPITAL (Children's ANNEXE), LUTON, BEDFORDSHIRE. RESIDENT PÆDIATRIC HOUSE OFFICER required end of December. The post is recognised for the D.C.H., and as a second pre-registration post in medicine. The duties cover both medical and surgical wards.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds, as soon as possible.

MALVERN. ST. WULSTAN'S HOSPITAL. (230 Beds.) RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer) required. Good experience in modern treatment of pulmonary tuberculosis. Work mainly medical but hospital has own Thoracic Surgical Unit.

Applications to Physician-Superintendent.

MANCHESTER (near). ROYAL MANCHESTER CHILDREN'S HOSPITAL, PENDLEBURY, near MANCHESTER. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the following appointments:—

SENIOR HOUSE OFFICER (resident). Vacant 1st February, 1958. Post tenable for 12 months (6 months medical and 6 months surgical). Candidates should preferably have had previous pædiatric experience.

SENIOR HOUSE OFFICER. Resident surgical post vacant 1st February, 1958. Post tenable for 6 months. Candidates should preferably have had previous pædiatric experience.

SURGICAL HOUSE OFFICER (resident). Vacant 1st February, 1958. Post tenable for 6 months and open to pre-registration graduates.

HOUSE PHYSICIAN, Professorial Unit, University Department of Child Health, resident. House Officer status. Vacant 1st February, 1958. Appointment for period of 6 months and open to pre-registration graduate.

Applications to Hospital Secretary not later than 2nd December, 1957.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the resident post of REGISTRAR for the Chest Unit at Monsall Hospital, Manchester. The unit comprises 96 tuberculous and 48 non-tuberculous beds and offers excellent experience in thoracic medicine and surgery. The appointment also includes duties at the outpatient clinic held at the Northern Hospital, Manchester.

Applications, stating age, present post, experience and names of 2 referees, to be forwarded immediately to the Secretary, Monsall Hospital, Newton Heath, Manchester, 10.

MANCHESTER REGIONAL HOSPITAL BOARD. North AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR (chest diseases) required to carry out duties arranged by the Consultant Chest Physician at the Altrincham, Northwich, Crewe Chest Clinics and Hefferston Grange Sanatorium. Accommodation might be arranged, if necessary.

Applications, together with 2 recent testimonials, should be sent to the Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

MANCHESTER REGIONAL HOSPITAL BOARD. Birch HILL HOSPITAL. REGISTRAR in Obstetrics and Gynæcology (resident) required immediately. Recognised for D.Obst.R.C.O.G.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade). Candidates must have held house appointments but previous laboratory experience is not essential. The duties will consist of routine work in the Department of Clinical Pathology, mainly at Saint Mary's Hospitals, but the holder of the post will also spend some time in the Manchester Royal Infirmary.

Application to be made on forms obtainable from the undersigned and submitted by 6th December, 1957.

A. R. WISE, General Superintendent,

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of SENIOR HOUSE OFFICER in Gynæcology. Applicants must have had previous hospital experience in medicine and surgery. The post is recognised for the purpose of the M.R.C.O.G. examination. The appointment is for 6 months starting 1st January, 1958. Salary in accordance with national scale.

Application forms may be obtained from the undersigned and returned not later than 6th December, 1957.

A. R. WISE, General Superintendent,

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General hospital—433 Beds.) SENIOR HOUSE OFFICER required for Group Laboratory. Post vacant early December, and tenable for 1 year. Duties which alternate with holder of second similar post include routine general pathology and emergency investigations. Laboratory recognised for D.Path. and D.C.P. examinations. Previous experience not essential.

Application forms from Group Secretary.

MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the West Kent General Hospital, and the Kent County Ophthalmic and Aural Hospital, Maidstone (total beds 254). The post, which is of Senior House Officer grade, carries a salary of £819 10s. a year less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A. R.C.S. examination.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, West Kent General Hospital, Maidstone.

MANSFIELD AND DISTRICT HOSPITAL. (206 Beds. Recognised training hospital for D.A. and F.F.A.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (anæsthetics) required. Post vacant 13th January. Appointment for 1 year in the first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 2nd December, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NEWCASTLE GENERAL HOSPITAL. (838 Beds.) Senior HOUSE OFFICER for Orthopædic Department. Vacant 1st January, 1958.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE GENERAL HOSPITAL. (838 Beds.) The following resident posts become vacant on the 7th January, 1958 :—

* HOUSE PHYSICIANS (4) General Medical Wards. (2 of these posts rotate with the House Physician post in the Cardiovascular Department.)
* HOUSE PHYSICIAN (1), Cardiovascular Department. (This post rotates with the 2 House Physician posts in general medicine.)
* HOUSE PHYSICIANS (4), Pædiatrics. (Hospital for Sick Children, Newcastle upon Tyne (2) and Children's Department, Newcastle General Hospital (2).) (3 of the posts are for pre-registration candidates (medical and surgical).) The posts offer experience in the whole of the pædiatric work of the hospitals, including general medicine and surgery and the special departments. There is a close association with the University Department of Child Health.
* HOUSE PHYSICIAN (1), Geriatric Unit.
* HOUSE SURGEONS (2) General Surgery (recognised for F.R.C.S. Diploma).
* HOUSE SURGEON (1), Accident and Admission Department (recognised for F.R.C.S. Diploma).
* These posts are recognised for the purpose of pre-registration service and applications will be accepted from students on the point of taking their qualifying examination.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4, by 7th December, 1957.

NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE AND HEXHAM AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Departments of Obstetrics and Gynæcology. Applications are invited for the following posts, vacant on 7th January, 1958.

(1) **Newcastle General Hospital** (838 Beds)

Department of Obstetrics and Gynæcology (100 Beds).

HOUSE SURGEONS, resident (pre-registration) (2). This department is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G., and undertakes the training of medical students in the University of Durham. Preference will be given to provisionally registered candidates who have carried out their first house appointment.

(2) **Hexham General Hospital** (304 Beds)

Gynæcology. HOUSE SURGEON, resident (pre-registration). Recognised for M.R.C.O.G. Applications considered from final year students in anticipation of graduation.

(3) **Dilston Hall Maternity Hospital, Corbridge** (50 Beds)

Obstetrics. HOUSE SURGEON, resident (pre-registration). Recognised for D.Obst.R.C.O.G.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, by 7th December, 1957.

NEWCASTLE REGIONAL HOSPITAL BOARD. Registrar orthopædic surgeon, whole-time, for Gateshead Group of hospitals (approximately 150 orthopædic beds). Single accommodation available. Consultant Orthopædic Surgeon also attends at Teaching Hospital.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Locum REGISTRAR PHYSICIAN, whole-time, for Geriatric Unit, Sunderland Group of hospitals—main hospital, Sunderland General (217 Beds for geriatrics) for period of approximately 3 months.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, immediately.

NEWCASTLE REGIONAL HOSPITAL BOARD. Special AREA FOR CUMBERLAND AND NORTH WESTMORLAND. EAST CUMBERLAND GROUP OF HOSPITALS. SURGICAL REGISTRAR (resident), whole-time, required for 1 year in the first instance, with the likelihood of extension. Main duties at the Cumberland Infirmary, Carlisle (332 Beds), where the Registrar will have duties in the casualty department and in the wards. The post is recognised under the F.R.C.S. regulations.

Applications, together with names and addresses of 1–3 referees and/or 1–3 testimonials, to the Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of HOUSE PHYSICIAN, vacant 21st December, 1957. Duties include house charge of general medical and pulmonary tuberculosis beds. The post is recognised for pre-registration, is resident and tenable for 6 months. Salary in accordance with national scale.

Applications, with 3 recent testimonials, to Medical Superintendent.

NORTHAMPTON GENERAL HOSPITAL. (500 Beds.) Vacancy 1st February, 1958, for SENIOR HOUSE OFFICER, E.N.T. Department. Recognised for F.R.C.S. and for D.L.O. Appointment to 30th September, 1958, in first instance.

Applications as soon as possible to S. G. HILL, Superintendent.

NORTHAMPTON. ST. ANDREW'S HOSPITAL. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER. The successful candidate will work in the Hospital and outpatient clinics. The Hospital is recognised for training for the D.P.M. Exceptional postgraduate facilities are available. Salary £669 10s. p.a., together with full residential emoluments, valued for superannuation purposes at £150 p.a. If married, unfurnished house will be provided with light, coal, laundry, and garden produce. The Hospital operates outside the National Health Service, but reciprocity has been granted between the National Health Service superannuation scheme and the Hospital superannuation scheme, so that years of service are transferable in either direction.

Applications, stating age, qualifications, experience, &c., together with copies of 3 recent testimonials, to be addressed to the Medical Superintendent.

NORTHAMPTON. ST. CRISPIN HOSPITAL, Duston, NORTHAMPTON. (1120 Beds.) SENIOR HOUSE OFFICER required. Salary according to national scale (£745 p.a.). Accommodation is available at the Hospital. The Hospital is approved for training for the D.P.M. of the Conjoint Board and the post offers excellent opportunities for participation in inpatient and outpatient work, E.E.G. investigations, and child psychiatry. There is a modern Admission Unit and an annual admission-rate of over 850 patients p.a. Regular case conferences are held.

Applications, giving full details and names of 3 referees, to be sent to the Physician-Superintendent at the Hospital within 14 days.

NEWARK HOSPITAL, London-road, Newark, Nottinghamshire. (General.) Resident Locum JUNIOR HOSPITAL MEDICAL OFFICER (medical) required for period 2nd December, 1957–4th January, 1958, inclusive. Salary £19 5s. per week less residential emoluments.

Applications, stating qualifications, with copies of 2 recent testimonials, to the Group Secretary, General Hospital, Nottingham, as soon as possible.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. OPHTHALMIC REGISTRAR, whole-time, required for duties mainly in the Ophthalmic Unit (25 Beds) at Edgware General Hospital, Edgware, plus 1 session per week at Colindale Hospital and 2 sessions per week at Wealdstone School Clinic.

Application forms obtainable from and and returnable to Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 3rd December, 1957.

NOTTINGHAM CITY HOSPITAL. (611 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER in the Department of Thoracic Surgery. Post vacant December 24th. Salary £819 10s. p.a. less £150 for residential emoluments. The appointment will be for 1 year.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 testimonials, should be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM. HIGHBURY HOSPITAL, Bulwell, NOTTINGHAM. SENIOR HOUSE OFFICER (surgical) required at the above Hospital. Good opportunity for obtaining experience in all types of general surgery. Vacancy with effect, 1st December, 1957.

Applications, stating age, qualifications, experience and nationality, together with copies of testimonials, to be sent to Hospital Secretary.

OXFORD REGIONAL HOSPITAL BOARD. Registrar to the Warneford and Park Hospitals, Oxford. The Warneford Hospital (140 Beds) is an acute psychiatric unit. The Park Hospital is an associated Neurosis Centre (30 Beds). Full training facilities available for the D.P.M. Candidates should preferably be young graduates starting the specialist study of psychiatry. Single accommodation available.

Applications, on forms obtainable from the Secretary, Registrars Committee, 43, Banbury-road, Oxford, should reach him by 10th December.

OXFORD. UNITED OXFORD HOSPITALS. Applications invited for post of NON-RESIDENT REGISTRAR in the Department of Pathology, Radcliffe Infirmary, to commence as soon as possible. There will be opportunities for working in all the departments including neuropathology.

Applications on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 30th November.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited for posts of HOUSE OFFICER and SENIOR HOUSE OFFICER in Accident Service, Radcliffe Infirmary, with effect from 1st January and 1st February, 1958, respectively, for a period of 6 months.

Applications, stating age, qualifications and experience, together with names for reference purposes, should be received by the Administrator, Radcliffe Infirmary, Oxford, by 30th November.

OXFORD. UNITED OXFORD HOSPITALS. THE RADCLIFFE INFIRMARY. Applications are invited for the post of REGISTRAR/RESEARCH ASSISTANT to the Accident Service from the 1st December, 1957. The duties of this post will be divided equally between the clinical duties of the Registrar appointment, and research work in the Department, under the supervision of the Director of the Accident Service.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be returned as soon as possible.

PETERBOROUGH. MEMORIAL HOSPITAL. PETERBOROUGH AND STAMFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the position of HOUSE PHYSICIAN, vacant on 28th January, 1958. The appointment will be for 6 months.

Applications, with testimonials, should be addressed to the Secretary, Memorial Hospital, Peterborough.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. Vacancies exist in the following departments:—

HOUSE SURGEON (pre-registration post), vacant 1st December. Recognised for the F.R.C.S. Devonport Hospital.

HOUSE SURGEONS (pre-registration posts), vacancies 9th December, 1957, 1st and 4th January, 1958. Recognised for the F.R.C.S. Greenbank Road Hospital.

In both cases send names of 3 referees to the Group Secretary, 7, Nelson-gardens, Devonport.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. FREEDOM FIELDS HOSPITAL. Central Casualty Department.

SENIOR HOUSE OFFICER in Casualty, vacant 1st January, 1958. Recognised for the F.R.C.S.

Applications, stating names of 3 referees, to be sent to the Group Secretary.

PLYMOUTH. THE SCOTT ISOLATION HOSPITAL. PLYMOUTH SPECIAL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER from Male registered medical practitioners who have preferably been qualified for 1 year, and have had previous hospital experience. The applicant should be able to drive a car. The duties, in 2 departments, will be chiefly in connection with infectious and venereal diseases, the former including a substantial proportion of cases in children. The varied clinical work, including acute medical cases, provides valuable experience particularly to those reading for a higher medical degree, or contemplating general practice. The appointment will be for 1 year, vacant at the end of December, 1957. The post is non-resident, but the successful candidate will be required to live near the hospital and be on the telephone.

Applications, together with copies of 2 recent testimonials, should be sent to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth, as soon as possible.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

(1) **Saint Mary's Hospital**

Applications are invited for the appointment of SENIOR HOUSE OFFICER (medical), vacant 9th December, 1957. Duties will be mainly in the acute medical wards and outpatients, but there will be some duties in the Geriatric Assessment Unit of 76 Beds. The appointment affords an opportunity of seeking large numbers of acute cases and is an excellent one for those studying for a higher medical qualification.

(2) **Royal Portsmouth Hospital**

(*a*) **Orthopædic Department** (104 beds)

(i) SENIOR HOUSE OFFICER required. Vacant 1st December, 1957.

(ii) HOUSE OFFICER (pre-registration). Vacant now.

(*b*) SENIOR HOUSE SURGEON (70 surgical beds). Vacant now.

(3) **Queen Alexandra Hospital**

(*a*) SENIOR HOUSE SURGEON (87 surgical beds). Vacant 1st January, 1958.

(*b*) HOUSE PHYSICIAN (pre-registration) (78 medical beds). Vacant 1st January, 1958.

Applications, stating age, experience and qualifications, together with the names of two referees, should be forwarded as soon as possible to E. H. HURST

St. Mary's Hospital, Milton-road, Portsmouth.

RHYMNEY AND SIRHOWY VALLEYS HOSPITAL MANAGEMENT COMMITTEE.

St. James' Hospital, Tredegar, Monmouthshire. (38 general medicine, 43 chronic sick and 43 obstetric beds.) Married quarters.

HOUSE PHYSICIAN (from 27th January).

OBSTETRIC HOUSE OFFICER (9th February).

Tredegar General Hospital. Surgical Unit of 50 Beds plus 6 orthopædic beds under daily supervision of Consultant Surgeon and visiting supervision of Orthopædic Surgeon. Busy Outpatient, Casualty, and Radiology Departments. Married quarters.

HOUSE SURGEON (26th January) with opportunity to follow on with a House Physician or House Officer (obstetrics) if satisfactory.

Caerphilly District Miners Hospital, Caerphilly, Glamorganshire. (Acute general hospital—228 Beds), 6 miles from City of Cardiff; married quarters may be available; vacancies on 1st February:—

HOUSE SURGEON (post recognised for F.R.C.S.).

HOUSE PHYSICIAN.

HOUSE OFFICER (obstetrics and gynæcology).

Applications to the Group Secretary, Central Offices, Caerphilly-road, Ystrad Mynach, Hengoed, Glam.

RICHMOND, SURREY. ROYAL HOSPITAL. Pre-registration HOUSE SURGEON required 27th November for busy acute General Hospital with full consultant staff.

Applications invited immediately (acceptable in advance of examination results) giving age, qualifications, and names of 2 referees, to Administrative Officer.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (medicine) (resident), pre- or post-registration post, required at Birch Hill Hospital. Post vacant 1st January, 1958.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) in the Department of Pathology of the Rochdale Group of hospitals. The duties will consist mainly of clinical pathology, also general and emergency work and supervision of the blood banks. Previous pathology experience is not essential. Post vacant end of year.

Applications, giving usual particulars and names and addresses of 2 referees, to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancashire, at once.

READING. BATTLE HOSPITAL. (391 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON in the Accident and Orthopædic Department. Post vacant now. F.R.C.S. recognised. Also casualty duties.

Apply, stating age, qualifications with dates, nationality, present post, with 1 copy of recent testimonial, to Hospital Secretary.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER to the Department of Geriatric Medicine which is being developed at Battle Hospital, Reading, under the charge of a Consultant Geriatric Physician.

Further particulars may be obtained from the Group Secretary, 3, Craven-road, Reading, to whom applications, stating age, qualifications and names of 3 referees, should be addressed.

ROCHESTER. ST. BARTHOLOMEW'S HOSPITAL. (Recognised for the F.R.C.S.) MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEONS (2). Applications are invited for 2 pre-registration posts, general surgery, 1 vacant from middle of December and 1 from the middle of January. If held by a registered practitioner, posts will be limited to 6 months. Salary £467 10s.–£577 10s. p.a. according to experience.

Applications, stating age, qualifications, nationality and experience, to be addressed to the Hospital Secretary.

ROCHESTER, KENT. ST. BARTHOLOMEW'S HOSPITAL. MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer grade) (1 of 2 in the department) which offers excellent experience with fractures and emergency surgery, and presents facilities for studying. Recognised for F.R.C.S. Post vacant now and tenable for 1 year. Salary £819 10s. p.a.

Applications, stating age, nationality, qualifications and experience, with recent testimonials, to be sent to the Hospital Secretary.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (620 Beds.) Applications required from pre-registration candidates for a 6 months' appointment of HOUSE SURGEON (recognised for F.R.C.S.), to be followed, subject to satisfactory service, by a 6 months' appointment as HOUSE OFFICER (obstetrics) (recognised for D.Obst.R.C.O.G.). Post vacant approximately 1st December.

Applications, accompanied by 1 testimonial, to reach the undersigned as soon as possible. J. C. FIELD, Secretary.

ROCHFORD, ESSEX. GENERAL HOSPITAL. Required, Locum REGISTRAR for the Obstetric Unit, from 1st to 14th December, 1957.

Apply immediately to the undersigned.

J. C. FIELD, Secretary.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. ResiDENT PATHOLOGIST (Senior House Officer grade). This post, which will become vacant in the New Year, provides valuable experience by rotation through all departments of this large Group Laboratory and is recognised for the purposes of the Diploma in Pathology. Prospective candidates are invited to visit the Laboratory.

Applications should be sent, with testimonials or the names of 2 referees, as soon as possible to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit from 3rd December, 1957. The service consists of 100 Beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT PÆDIATRIC HOUSE PHYSICIAN (Male or Female) required from 4th December, 1957. The Department includes a Premature Baby Unit of 9 Cots and 50 children's medical beds.

Applications should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, at the Hospital.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order from 1st January, 1958, for a period of 6 months in each post. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR in General Surgery on the staff of the Aberdeen General Hospitals with duties at peripheral hospitals.

Applications, together with the names of 2 referees, should be forwarded by 10th December, 1957, to the Senior Administrative Medical Officer, 1, Albyn-place, Aberdeen, from whom further particulars and a form of application may be obtained.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Medicine for duty within the Rheumatic Unit at the Northern General Hospital, Edinburgh. The Unit undertakes a considerable amount of research work, and preference will be given to candidates with some previous experience in the treatment of rheumatic disorders.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 14th December, 1957.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Orthopædic Surgery to the West Fife Group of hospitals, based on the Dunfermline and West Fife Hospital.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 14th December, 1957.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Diseases of the Chest in hospital of the Edinburgh Royal Victoria Group and the Edinburgh Northern Group (in association with the Department of Tuberculosis and Diseases of the Respiratory System, University of Edinburgh) for the period of 1 year in the first instance.

Apply, giving particulars of age, qualifications and previous experience and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 14th December, 1957.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. General Medicine. Stracathro Hospital, Brechin. Applications are invited for the post of REGISTRAR in Medicine at Stracathro Hospital, Brechin (a general hospital of 676 Beds—150 medical). Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 7th December, 1957.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Tuberculosis—Perth area. Applications are invited for the post of REGISTRAR in Tuberculosis and Industrial Chest Diseases for work in tuberculosis in the Perth area and a new Diagnostic Unit for Industrial Chest Diseases at Bridge of Earn (General) Hospital (806 Beds). Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 7th December, 1957.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Dundee area. (Thoracic (and cardiac) surgery). Applications are invited for the appointment of SENIOR REGISTRAR or REGISTRAR in Surgery (depending upon qualifications and experience) for duty in the Regional Thoracic Surgical Centre at Ashludie Hospital, Monifieth, by Dundee (222 Beds—60 for thoracic surgery), and in the cardiovascular department of the Professorial Surgical Unit at Dundee Royal Infirmary (the principal general teaching hospital associated with the University of St. Andrews—534 Beds). Previous experience in thoracic surgery and general chest medicine an advantage. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 7th December, 1957.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance:—

SENIOR REGISTRAR in Ophthalmology based at the Glasgow Ophthalmic Institution.

2 REGISTRARS in E.N.T. Surgery based at Stobhill General Hospital, Glasgow.

REGISTRAR in Psychiatry for duties at Bellsdyke Mental Hospital, Larbert, and at H.M. Institution, Polmont.

REGISTRAR in Psychiatry based at the Glasgow Royal Mental Hospital.

REGISTRAR in Surgery based at Law Hospital, Carluke.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 7th December, 1957.

SHOREHAM BY SEA, SUSSEX. SOUTHLANDS HOSPITAL. (411 Beds.) WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. 2 HOUSE SURGEON posts, both recognised by R.C.S. for fellowship. 1 vacant now, duties in general surgery and orthopædics. 1 vacant 17th December, pre-registration or registered practitioner.

Applications to Secretary, Southlands Hospital.

A. V. OAKTON, Group Secretary.

SHEFFIELD. MIDDLEWOOD HOSPITAL. (2089 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT SENIOR REGISTRAR in Psychiatry required. D.P.M. essential. Appointment for 1 year in the first instance, reviewable annually. Opportunity for research and experience in the special branches of psychiatry available in the hospital area.

Application forms and further details obtained from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 9th December, 1957.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY. Applications invited for the non-resident or resident post of CASUALTY AND ORTHOPÆDIC REGISTRAR in the Orthopædic and Accident Department at the above Hospital. Post vacant 4th December. Post recognised for Casualty requirements for the final F.R.C.S.

Applications, stating age, qualification and experience, with the names of 3 referees, should be sent immediately to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD. UNITED SHEFFIELD HOSPITALS BOARD OF GOVERNORS AND SHEFFIELD REGIONAL HOSPITAL BOARD. Reciprocal training scheme for Senior Registrars. 3 Whole-time SENIOR REGISTRARS in Radiology required with initial tenures of appointment respectively as follows:—

(1) United Sheffield Hospitals.

(2) City General Hospital, Sheffield and Barnsley or Rotherham Group of Hospitals.

(3) Leicester Royal Infirmary.

Candidates should hold a Diploma in Diagnostic Radiology. Appointments for 1 year in first instance and renewable thereafter annually. The successful candidates will be transferred as appropriate to a regional hospital or the teaching hospitals, for the second phase of the appointment in accordance with the arrangements under the Reciprocal training scheme. Renewal of appointment and transfer will be subject to satisfactory work and progress.

Further details and form of application from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 2nd December, 1957.

SHEFFIELD, S. CITY GENERAL HOSPITAL. DEPARTMENT OF PATHOLOGY, GROUP LABORATORY. Applications are invited for the appointment of SENIOR HOUSE OFFICER (clinical pathology). Resident accommodation is available and optional. Opportunities for training in morbid anatomy, biochemistry, hæmatology and bacteriology. The work of this and the associated hospitals offers excellent experience to graduates who wish to make pathology their permanent career. The post is recognised for the D.Path.

Apply, giving details of age, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, to the Group Secretary, Nether Edge Hospital, Sheffield, 11.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. Applications invited for post of HOUSE SURGEON Senior House Officer/Pre-registration, vacant early February. Modern Hospital with busy department including general surgery and gynæcology.

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. House PHYSICIANS. Applications invited for 2 posts—1 graded Senior House Officer/Pre-registration, vacant mid-January—1 graded Pre-registration/Senior House Officer, vacant late January. Modern Hospital with busy department, including medicine, pædiatrics, skins and eyes, with busy outpatient clinics offering good experience.

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) Senior House Officer to work as CLINICAL PATHOLOGIST to Group Laboratory. Appointment tenable for 1 year, resident or non-resident. Recognised for Diploma in Pathology. Vacant 1st January, 1958. A Unit of the Public Health Laboratory service is housed in the same buildings and there are facilities for training in all the 4 main branches of pathology.

Applications to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury, naming 3 referees.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. SENIOR HOUSE OFFICER (Casualty) required, working with Casualty Registrar in busy Casualty Department. Post recognised for F.R.C.S. Experience given in plastic and orthopædic cases.

Applications, with names of 2 referees, to Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. HOUSE SURGEON required, pre-registration post.

Applications, with names of 2 referees, to Secretary.

SOUTHAMPTON CHILDREN'S HOSPITAL. (Recognised by Conjoint Board for D.C.H.) HOUSE OFFICER required. Total establishment of 3 residents. Salary, &c., as nationally advocated.

Applications, with copies of testimonials, to be submitted by 30th November, 1957, to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON EYE HOSPITAL. (32 Beds. Recognised for D.O. Examination.) RESIDENT SENIOR HOUSE OFFICER required end December.

Applications, with copies of testimonials, should be forwarded as soon as possible to Secretary, Southampton Group Hospital Management Committee, Bullar-street.

SOUTHAMPTON GENERAL HOSPITAL. (474 Beds.) RESIDENT HOUSE SURGEONS (2) required. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (474 Beds.) RESIDENT HOUSE PHYSICIAN required mid-November. Pre-registration candidates eligible.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (274 Beds.) RESIDENT HOUSE SURGEON required. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHEND-ON-SEA GENERAL HOSPITAL. Applications are invited for appointment as HOUSE PHYSICIAN (pre-registration). Post vacant 16th December, 1957.

Applications, stating age, qualifications and previous experience, with copies of recent testimonials (1 testimonial sufficient from applicants for first appointment) to reach the undersigned by 26th November, 1957. J. C. FIELD, Secretary.

SOUTHEND-ON-SEA GENERAL HOSPITAL. Applications are invited from registered or provisionally registered practitioners for appointment as RESIDENT HOUSE SURGEON. Post vacant 6th December, 1957.

Applications, stating age, qualifications and previous experience, with copies of recent testimonials (1 testimonial sufficient from applicants for first appointment), should reach the undersigned by 21st November, 1957. J. C. FIELD, Secretary.

SOUTHEND GENERAL HOSPITAL. Applications are invited for the post of SECOND CASUALTY OFFICER (Senior House Officer grade), with duties in the Fracture and Orthopædic Department. Resident. Post vacant 1st January, 1958. The post is recognised for the F.R.C.S.

Applications, stating age, qualifications and experience, with copies of recent testimonials, to reach the undersigned as soon as possible. J. C. FIELD, Secretary.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) Locum Tenens CASUALTY OFFICER (Registrar grade) required for the period 2nd–14th December, 1957, inclusive.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE SURGEON (House Officer grade) required for 1 of the 2 surgical teams from 19th December, 1957. Post recognised for F.R.C.S. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE PHYSICIAN (House Officer grade) required for 1 of the 2 medical teams. Post vacant 21st December, 1957, and tenable for 6 months. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid-Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS, HERTFORDSHIRE. HILL END HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time PSYCHIATRIC REGISTRAR required at above Hospital. Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans, by 6th December, 1957.

ST. ALBANS (near). SHENLEY HOSPITAL. (2360 Beds—16 miles from London.) Applications are invited for the post of PSYCHIATRIC REGISTRAR at above Hospital. Single residential accommodation available. The Hospital may be visited by appointment.

Application forms obtainable from and returnable to Secretary, Shenley Hospital, near St. Albans, Herts, by 9th December, 1957.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time appointment as ANÆSTHETIST (second year Registrar) to fill a vacancy in the approved establishment at Eastbourne Group of hospitals. The salary will be £1061 10s. p.a. and the appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales) and will be for 1 year in the first instance, renewable for a further year.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 7th December, 1957.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Orthopædic Surgery to fill a vacancy in the approved trainee establishment at the Hastings Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 7th December, 1957.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time appointment as RESIDENT SURGICAL OFFICER to fill a vacancy in the approved establishment at the Isle of Thanet Group of hospitals available on 1st February, 1958. This appointment includes, in addition, duties connected with urological surgery. The salary will be £1061 10s. p.a. and the appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales) and will be for 1 year in the first instance, renewable for a further year.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 7th December, 1957.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. SENIOR HOUSE OFFICER (E.N.T.) required. Recognised F.R.C.S. and D.L.O.

Detailed applications, with copy testimonials to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE PHYSICIAN required (pre-registration). Post vacant early January.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (general surgery) required. Recognised for F.R.C.S. 2 posts vacant early January.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of CASUALTY OFFICER of Junior Hospital Medical Officer grade, at the above Hospital. Resident or non-resident. Vacancy 5th December, 1957.

Full particulars, stating age, qualifications and experience, together with the names of 2 referees, should be forwarded to the Secretary of the Hospital.

T. E. JONES, Group Secretary.

STOKE MANDEVILLE HOSPITAL, Aylesbury, Buckinghamshire. RESIDENT HOUSE PHYSICIAN required for the Department of General Medicine. Recognised pre-registration post. Applications from registered practitioners will be considered. Post vacant 16th January, 1958.

Applications, with copies of 2 testimonials, to the Administrative Officer by 6th December, 1957.

STOKE MANDEVILLE HOSPITAL, Aylesbury, Buckinghamshire. HOUSE SURGEON for Gynæcology Department. Post recognised for M.R.C.O.G. Vacant 1st January, 1958.

Applications from registered practitioners, with 2 testimonials, to the Administrative Officer as soon as possible.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. (423 Beds.) HOUSE OFFICER (general surgery) required. Pre-registration post recognised for F.R.C.S. 2 posts vacant, 28th November, 1957, and 9th January, 1958, respectively.

Applications, stating age, nationality and qualifications, to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton, Somerset, immediately.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical), Male or Female, required approximately 15th December, 1957. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, nationality and age, together with copy testimonials (quoting reference F.955/84), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TORQUAY. TORBAY HOSPITAL. (166 acute general beds.) HOUSE OFFICER (medicine), Male or Female, required early January 1958. Pre-registration appointment. General duties which will include some work in the E.N.T., the Ophthalmic and Radiotherapy Departments.

Applications, stating qualifications, nationality, age, together with copy testimonials (quoting ref. F.955/85) to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TORQUAY. TORBAY HOSPITAL. Resident Casualty OFFICER (Senior House Officer status) required approximately 23rd December, 1957. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, nationality, age (quoting ref. F.955/86), with copy testimonials, to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TREDEGAR GENERAL HOSPITAL, MONMOUTHSHIRE. RHYMNEY AND SIRHOWY VALLEYS HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SURGICAL OFFICER (Senior House Officer or Junior House Medical Officer grade according to experience) required for Surgical Unit at above Hospital. Duties are those of Assistant to General Surgeon; staff, includes House Surgeon. Commodious family flat.

Apply, with full particulars and stating names of 2 referees, to Secretary.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, PEMBURY. TUNBRIDGE WELLS GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for vacant post of HOUSE SURGEON in Orthopædic Unit. Pre-registration post.

Apply, stating age, qualifications, together with testimonials, to Surgeon-Superintendent.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, PEMBURY. Applications invited for appointment of SENIOR ORTHOPÆDIC HOUSE SURGEON AND CASUALTY OFFICER (Senior House Officer grade) to begin duties as soon as possible. Recognised F.R.C.S. (Eng.) and tenable for 1 year. Work includes treatment of long and short stay cases and traumatic surgery with large Outpatient and Fracture Clinics under 2 Consultants.

Apply, stating age, qualifications and experience, together with 3 testimonials, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

WARRINGTON INFIRMARY. Applications are invited from Males and Females for the post of RESIDENT CASUALTY OFFICER (graded as Junior Hospital Medical Officer) at the above Hospital. The post is now vacant and is recognised for the F.R.C.S. Scale of salary £852 10s.–£55–£1182 10s., less a deduction of £170 for the residential emoluments. A whole-time Senior Hospital Medical Officer is in charge of the Department.

Applications, stating age, experience and qualifications, should be forwarded to—

HENRY L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARWICK (near). KING EDWARD VII MEMORIAL CHEST HOSPITAL, Hertford Hill, near WARWICK. (228 Beds.) SENIOR HOUSE OFFICER (resident). Applications invited for this appointment in modern Thoracic Surgical Unit. All forms of major and minor thoracic surgery undertaken. Post offers wide general training in cardiac, œsophageal and pulmonary surgery. Facilities available for postgraduate study. Previous experience in specialty not essential.

Applications to Medical Superintendent.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. SURGICAL REGISTRAR (resident) required at above Infirmary. Preference given to holders of higher surgical qualifications. Post recognised for F.R.C.S.

Apply, with names of 2 referees, to Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (315 Beds.) HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant 1st December.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required, Male or Female, for post vacant 28th December. Pre-registration post, recognised for F.R.C.S.

Applications, stating age, nationality, qualifications with dates, and copies of recent testimonials, to Secretary by 27th November.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General and Orthopædic Surgery required, Male or Female, for post vacant 11th December. Pre-registration post—Hospital recognised for F.R.C.S.

Applications, stating age, qualifications, with dates, and nationality, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. Resident MEDICAL REGISTRAR required early February.

Application forms from and returnable to Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 7th December.

WELSH REGIONAL HOSPITAL BOARD.

SENIOR REGISTRAR in Psychiatry, North Wales Hospital for Nervous and Mental Disorders, Denbigh. Hospital provides comprehensive mental health service for North Wales. Out-patient clinics at major general hospitals and associated child guidance services. Every modern therapy and Department of Psychology and Electroencephalography. Modern open-door reception units; annual admission-rate over 1000. House available for married man and family.

REGISTRAR in Anæsthetics, based Bridgend General Hospital. Hospital recognised for F.F.A.R.C.S. Resident/non-resident.

REGISTRAR in Pædiatrics to serve Caernarvon and Anglesey Hospital Management Committee, based at St. David's Hospital, Bangor. Resident/non-resident.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WEST MALLING, KENT. LEYBOURNE GRANGE COLONY FOR MENTAL DEFECTIVES. (1511 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required at above Colony. Salary scale £852 10s.–£55–£1182 10s. a year. Appointment is subject to the terms and conditions of service for hospital medical and dental staff and is limited to a period of 3 years in the first instance. Usual residential accommodation for single officer. Ample facilities for study.

Applications, with full details as to age, nationality, qualifications, present post and previous experience, together with names and addresses of 2 referees, to the Group Secretary as soon as possible.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) SENIOR HOUSE OFFICERS (anæsthetics). Posts vacant 20th and 28th January. Recognised for D.A. and F.F.A. R.C.S.

Apply, giving age and qualifications with copies of 2 testimonials, to the Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Vacancies for Pre-registration HOUSE OFFICERS (medicine) occur on 2nd, 17th and 22nd January.

Please apply, with copies of 2 testimonials, to Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICER (pædiatrics) required. Vacant 20th January, 1958.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Hospital Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICERS. Vacancies in Surgery occur on 1st, 6th, 11th, and 23rd January, 1958.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Hospital Secretary.

DUBLIN. ROYAL VICTORIA EYE AND EAR HOSPITAL. OPHTHALMIC HOUSE SURGEON required for duties at the above Hospital. Appointment for 1 year from 1st January, 1958. Salary £275.

Applications, with testimonials, to be forwarded to the Registrar before 1st December, 1957.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as REGISTRAR in Anæsthetics at hospitals managed by the Coleraine and Portrush and North Antrim Hospital Management Committees. The terms and conditions will be in accordance with the application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 12th December, 1957.

CANADA. REGINA GENERAL HOSPITAL, Regina, SASKATCHEWAN, CANADA. Vacancies exist for appointments as RESIDENT and ASSISTANT RESIDENT in services of radiology, pædiatrics and obstetric/gynæcologist in 800-Bed General Hospital. All services very active. Stipend $200 per month for Assistant Resident: $250 for Residents. Full maintenance provided.

Apply: Superintendent.

MICHIGAN, U.S.A. OAKWOOD HOSPITAL, Dearborn, MICHIGAN. Applications are invited for 1 or 2-year approved GENERAL PRACTICE RESIDENCY in modern 234-Bed General Hospital 10 miles from Detroit. Excellent facilities. Hospital approved for exchange-visitor programme. Beginning monthly salary $250 if single, $300 if married. Free housing.

Apply: Director.

U.S.A. BETHESDA HOSPITAL, Cincinnati 6, Ohio, U.S.A. INTERNS—Rotation through Obstetrics, Medicine, Pediatrics and Surgery in a 12-month broad teaching programme. We desire applications from graduate medical doctors giving full details in first letter. $210 per month stipend; access to inexpensive meals; furnished room; uniforms; laundry; hospitalisation, and will advance passage one way.

Please apply to the Superintendent.

NEW ZEALAND. QUEEN ELIZABETH HOSPITAL, ROTORUA, NEW ZEALAND. There are 2 vacancies for MEDICAL OFFICERS at the Queen Elizabeth Hospital, Rotorua, New Zealand, a national institution engaged in research into, and the treatment of, rheumatoid arthritis and other rheumatic diseases. Commencing salary will be between £900 and £1060 according to qualifications and experience rising to £1170, together with full board and lodging.

Additional information, application forms, &c., may be obtained on request from the High Commissioner for New Zealand, 415, Strand, London, W.C.2; with whom completed applications should be lodged not later than 21st December, 1957.

Public Appointments

BIRMINGHAM. CITY OF BIRMINGHAM EDUCATION COMMITTEE. Applications are invited from registered medical practitioners (Men or Women) for appointment as SCHOOL MEDICAL OFFICER in the School Health Service. The possession of a D.P.H. or D.C.H. will be an advantage. Salary in accordance with Whitley Council scale of £1050–£50–£1200–£55–£1475 p.a. Appointment is subject to the appropriate superannuation act and to the passing of a medical examination.

Forms of application obtainable from the undersigned (stamped addressed envelope) must be returned by 17th December, 1957. Canvassing disqualifies.

E. L. RUSSELL, Chief Education Officer.

School Health Service, 102, Edmund-street, Birmingham, 3.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
CANNOCK ..	STAFFORD ..	7TH DECEMBER, 1957

LONDON COUNTY COUNCIL. Applications are invited from medical practitioners practising in locality under National Health Service for appointment as VISITING MEDICAL OFFICER to the Gresham Place Residential Nursery, Portley Wood-road, Whyteleafe, Surrey, accommodating 25 children (0–5 years). Remuneration £70 a year plus fees receivable from Executive Council in respect of residents and residential staff who may be taken on N.H.S. list.

Particulars and application forms from Medical Officer of Health (PH/D1/2090), County Hall, S.E.1, and returnable by 20th December.

NAVY, ARMY AND AIR FORCE INSTITUTES. Applications are invited from general practitioners in the undernoted towns for the appointment in a part-time capacity as MEDICAL OFFICERS to this Corporation. Successful applicants would be required to examine and report on the condition of employees of the Corporation who may be referred to them from time to time. Fees for this work will be paid on a scale agreed with the British Medical Association.

Applications, giving details of qualifications and experience, should be sent to the Chief Medical Officer, Navy, Army and Air Force Institutes, Kennington-lane, London, S.E.11, not later than 30th November, 1957.

The towns for which applications are invited are:—

AYR STIRLING ROSYTH LANARK PERTH

PRISON COMMISSIONERS require 3 Male Psychologists. Opportunities to compete for establishment posts up to age 29. Essential qualifications: 1st or 2nd class honours degree of recognised University in which psychology was taken as main subject, higher degree in psychology, Bachelor of Education degree of Scottish University or of the University of Belfast, postgraduate diploma in psychology following at least 2 years systematic study, fellowship of British Psychological Society, Associateship of British Psychological Society (subject to certain conditions). Exceptionally candidates without any of these qualifications may be accepted if he has at least 3 years' responsible professional experience. Salary basic grade (London rate) £595 at age 21 up to £945 at age 30 then to maximum of £1250. Rates somewhat lower outside London. 5-day week generally.

Particulars and application forms from M.L. and N.S., Technical and Scientific Register, (K), 26, King-street, London, S.W.1, quoting G.375/7A. Closing date 14th December, 1957.

GOVERNMENT OF SINGAPORE.

(*a*) SENIOR REGISTRAR (pathology) required for pathological duties in Singapore General Hospital, a teaching hospital.

(*b*) ANÆSTHETIST required to administer anæsthetics in government hospitals and instruct Junior Medical Officers, Intern House Physicians and medical students in technique and practice of anæsthetics.

Applications invited from doctors with qualifications registrable in United Kingdom. Diploma in Clinical Pathology or acceptable equivalent desirable for (*a*) and F.F.A. R.C.S. plus at least 6 years' post-registration experience, including 3 in anæsthetics required for (*b*).

Appointment on contract for 3 years resident service. Salary scale £1540–£1988 a year plus expatriation pay of £350 a year and temporary variable allowance of £210 a year for single officers, £392 for married officers without dependent children and £539 to £560 a year for officers with dependent children. Gratuity (taxable) payable after completion of contract £370–£450 for each year depending on salary. Special arrangements can be made for candidate from the National Health Service who wishes to retain superannuation rights. Salary dependent upon years of experience. European children do well in Singapore up to age of about 6 and schools are available. Income-tax at local rates. Government quarters with heavy furniture rentable if available or allowance in lieu. Free passages for officer, wife and children under 10 years not exceeding 5 persons in all. Generous leave.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD 117/25/016).

NORTHUMBERLAND COUNTY COUNCIL. Applications are invited from registered medical practitioners for the appointment of ASSISTANT COUNTY MEDICAL OFFICER to undertake duties primarily connected with maternal and child welfare. Salary scale £1050–£50–£1200–£55–£1475. Previous experience may be taken into consideration in determining the commencing salary. Travelling and subsistence allowances when applicable will be paid in accordance with the Council's scale. The appointment is subject to superannuation and will be determinable by 3 months' notice on either side. The successful candidate will be required to pass a medical examination. Applicants must hold a driving licence. Mileage allowance will be paid, or a car provided.

Forms of application and any further particulars required may be obtained from the County Medical Officer, County Hall, Newcastle upon Tyne, 1, and must be returned not later than 6th December, 1957.

GOVERNMENT OF SARAWAK. **Specialist Alienist** required to take charge of 200-bed mental hospital and supervise training of subordinate staff in mental hospital work. Candidates must possess qualifications registrable in United Kingdom and D.P.M., and have had postgraduate hospital experience.

Appointment as follows :—

(*a*) from National Health Service with retention of superannuation rights (3 years in first instance with overall maximum of 6 years) and gratuity (taxable) of 20% of aggregate salary on completion of engagement. Basic salary £2128 p.a. In addition inducement pay of £336 p.a. is payable plus education allowance of £140 p.a. for up to 2 children between ages of 5 and 17 educated outside Sarawak and a child allowance of 7½% of basic salary (maximum £140 p.a.) for married officers with dependent children under age 17 ; or

(*b*) on contract for 3 years in first instance with gratuity (taxable) of £308 p.a. Salary, inducement pay and allowances as above.

Partially furnished quarters, when available, at low rental. Free passages for officer, wife and up to 3 children under 18 years. Income-tax at local rates.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/24/08).

HER MAJESTY'S OVERSEAS CIVIL SERVICE. **Kenya.** MEDICAL OFFICERS with qualifications registrable in United Kingdom required for general duties. Successful candidates may be posted to any station in Kenya. During earlier years of service an officer will be expected to carry out general medical and surgical duties including varying amount of public health administration. In most stations, even if remote from the larger towns, it is possible to maintain interest in any particular branch of medicine or surgery to which the officer is attracted. The work of every medical officer is based on a hospital which may vary in size and facilities from small district hospital, meeting needs of comparatively primitive community, to large and modern provincial hospital. Appointments can be made on permanent basis with pension (non-contributory), or on short term contract with gratuity (taxable) payable on satisfactory completion of service. Salary ranges from £1284–£2115 p.a., starting point determined by experience. 4 extra increments given to successful candidates possessing the F.R.C.S., M.R.C.P., D.P.H., or other approved higher qualifications. Permanent medical officers can be members of Her Majesty's Overseas Civil Service and are eligible to be considered at any time for promotion to super-scale posts in Kenya and other territories in medical administration or, if they possess higher qualification and suitable experience, in specialist posts. Quarters when available at rental varying from £30–£78 p.a. according to size and type, and furniture at rate varying from £15–£36 p.a. Free passages in both directions for officer and wife and up to cost of 1 adult fare for children. Taxation at local rates. Annual local leave permissible and generous home leave granted after each tour of from 24–45 months. Educational facilities available.

Application forms from Director of Recruitment, Colonial Office, Great Smith-street, London, S.W.1 (quoting BCD. 117/7/02).

NEW SOUTH WALES DIVISION OF MENTAL HYGIENE, SYDNEY, NEW SOUTH WALES. Applications are invited from medical practitioners eligible for registration in New South Wales and in possession of a recognised Diploma in Psychological Medicine or equivalent qualifications, for the position of SUPERINTENDENT of Reception House. The Unit, situated in the centre of Sydney, has an admission rate of 3500 annually of whom some 2000 are certified and transferred to mental hospitals. New early treatment centres are in course of erection which will provide full treatment facilities. The successful applicant will be eligible for promotion to these and other mental hospitals as vacancies occur. A residence with 3 bedrooms is available. The present salary is £A2740 p.a. for experienced applicants.

Dr. Donald Fraser, the New South Wales Inspector General of Mental Hospitals will personally interview applicants for this and other posts as Psychiatrists in London until the 12th December, 1957. Requests for interview should be addressed to the Agent General for New South Wales, 56, Strand, London, W.C.2 (Tel. TRAfalgar 7477).

SOUTHERN RHODESIA. CITY OF BULAWAYO. CITY HEALTH DEPARTMENT. Vacancy for CLINICAL MEDICAL OFFICER (Male). Salary grade £1848–£60–£2028 p.a. The successful applicant will be responsible, under the Medical Officer of Health, for curative and preventive medical services provided by the Council at its African clinics and such other duties as may be allocated to the position from time to time. Further details of the vacancy, including information relating to the payment of travelling expenses by the Council, may be obtained from the Council's London Agents, Davis & Soper, Limited, 52/54, St. Mary Axe, London, E.C.3.

Applications must reach the Staff Vacancies Officer, Town Clerk's Department, P.O. Box 591, Bulawayo, Southern Rhodesia, by Friday, 27th December, 1957.

E. S. WHITE, Town Clerk.

DUMFRIES COUNTY COUNCIL. **Assistant Medical** OFFICER. Applications are invited from registered medical practitioners (male) possessing a diploma in public health for appointment as an assistant to the Medical Officer for the County of Dumfries. Applicants with experience of school medical service duties will receive special consideration. Salary on Whitley Council Scale (£1050–£1475 p.a.).

Particulars and forms of application may be obtained from the undersigned with whom applications should be lodged by 29th November, 1957. LESLIE T. CARNEGIE, County Clerk.

County Buildings, Dumfries, 8th November, 1957.

Miscellaneous

Biochemist. **A junior biochemist is wanted to work on** human plasma proteins in the Blood Products Laboratory, Lister Institute, Elstree.—Apply in writing, stating age, qualifications and any previous experience, to the Secretary, The Lister Institute of Preventive Medicine, Elstree, Herts.

Dental Surgeon with well-established industrial practice urgently requires new self-contained premises, separate entrance and toilet, near Central London, owing to near-expiration of present lease.—Address No. 350, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Histopathologist. **Pfizer Limited invite applications** from Histopathologists who have had experience of neuro-histopathology for a new appointment in the Company's Vaccine Production Unit at Richborough, Sandwich, Kent. The Company's premises are situated in a pleasant non-industrial area. A generous non-contributory pension and life assurance scheme is operated.

Applications, with details as to age, qualifications, experience, &c., should be addressed to Personnel Officer, 137/139, Sandgate-road, Folkestone, quoting Ref. E. 6608.

Korea. **Doctor (Female) required with paediatric** experience ; age preferably between 26 and 40. Contract 1 year renewable. Salary £1000 p.a. Maintenance equipment allowances and fares paid. 1 month's holiday per year. Duties in Pusan, Korea.—Apply Foreign Relief Secretary, Save the Children Fund, 12, Upper Belgrave-street, S.W.1. Telephone SLOane 9171.

Pfizer Ltd. has vacancy in Medical Department for a Medical Practitioner, aged about 30 years. The duties include arranging clinical trials with the Company's products, dealing with medical queries and general professional advisory work. The successful applicant must be prepared to travel. A non-contributory pension scheme is in operation. Initial salary £1500–£1750 depending on experience and qualifications.

Apply, with full details, to Personnel Officer, 137/139, Sandgate-road, Folkestone. Reference E6605.

Radiologist (Consultant) desires locum work : preferably S. England or Scotland.—Address, No. 349, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Ship's Surgeon required for cableship based overseas. Commission 18 months with option extension. Salary £1200 plus overseas allowance £180 p.a. Paid leave at rate of 5 days per month served overseas. Maximum age 35. Apply, in writing, Staff Manager, Cable and Wireless Ltd., Mercury House, Theobalds-road, London, W.C.1.

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in Basle, Switzerland. This job demands a wide knowledge of all aspects of medico-literary work, and preference will be given to candidates with full- or part-time experience of medical editing and journalism. An M.D. or M.R.C.P. is desirable but not essential providing the candidate is reasonably familiar with contemporary medical practice and literature. An appreciation of the problems of the pharmaceutical industry would also be an advantage. Ability to speak German or French would be useful. The work is varied and interesting and will bring the successful applicant into contact with the pharmacological and clinical research departments. Starting salary will be between Swiss Francs 15,000 and 20,000, depending on experience and qualifications. (Income tax is considerably lower than in the U.K.)

Applications, which will be treated in strict confidence, should give full details. A short list of applicants will be invited for interview in London in the first instance.

Address, No. 341, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 98, Victoria-street, S.W.1 (VIC 0141), who are specialists.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

The Disease of Tobacco Smoking and its Cure, by Dr. Lennox Johnston. 3s. 6d. from all booksellers.—CHRISTOPHER JOHNSON PUBLISHERS LIMITED.

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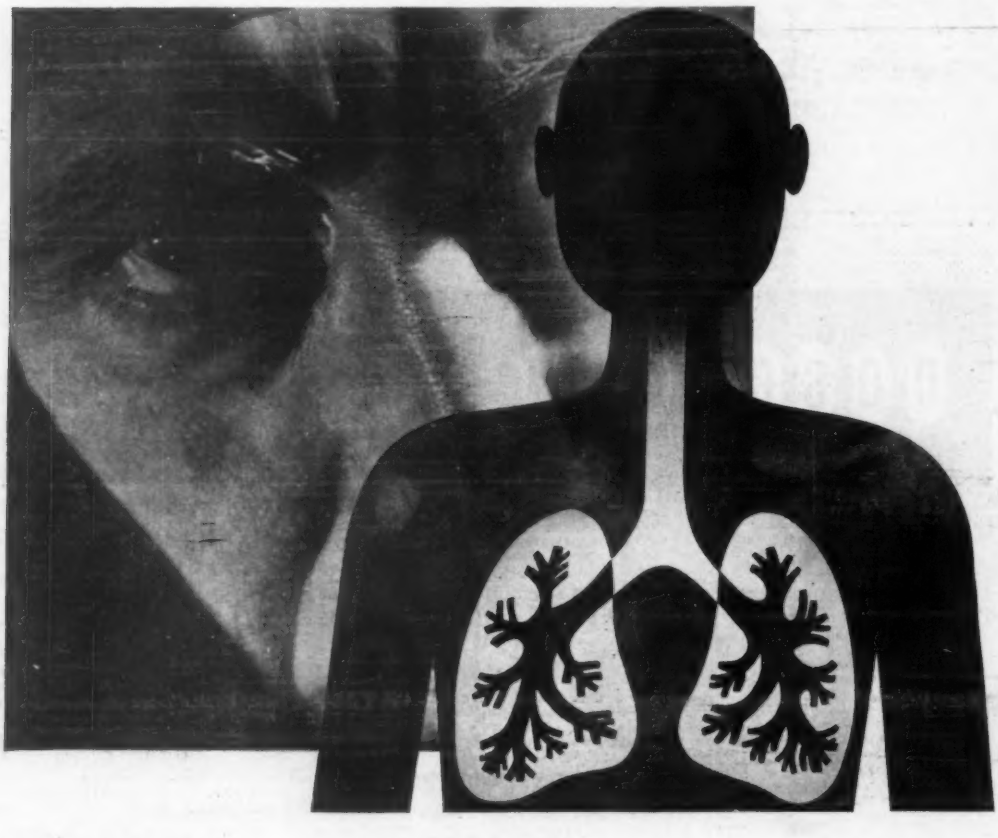

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